CBSPD
Dedicated to Education

Questions asked line to line from **FMGE Solutions** book in **FMG July 2024** with exact references from the book

144 MCQs came directly from **FMGE SOLUTIONS**

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Scan to Get the Questions & Explanations

Question 1

The examiner is testing for which muscles

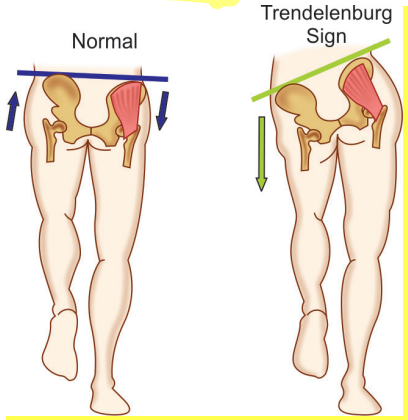
(FMGE JULY 2024)

a. Abductors
b. Adductors
c. Flexors
d. Extensors

209. Ans. (a) Paralysis of gluteus maximus

Ref: Maheswari Orthopaedics, 5th ed. pg. 135

- When a person stands on one leg, the tendency of unsupported side to sag down is *counteracted* by *gluteus medius and minimus*. These two muscles form the abductor mechanism of hip.



- In case the *abductor mechanism is defective*, unsupported side of the pelvis drops and is called *Positive Trendelenburg sign*. It is seen in:
  - Paralysis of gluteus medius and minimus
  - Congenital dislocation of Hip
  - Ununited fracture
  - Coxa vara

210. Ans. (d) Superior gluteal nerve

Ref: BDC 6th ed. Vol. II / 68-69, 70; Keith L. Moore 5th ed./619-621

- **Trendelenburg's sign** is found in people with weak or paralyzed abductor muscles of the hip, namely gluteus medius and gluteus minimus.
- **Superior gluteal** nerve, if injured, paralyses the 3 muscles: **gluteus medius**, **gluteus minimus** and tensor fascia latae and hence leads to positive **Trendelenberg test**.
- These 3 muscles, especially the gluteus medius raises the unsupported hip during walking, which otherwise will be pulled down by the gravity.
- In Trendelenberg test this action of gluteus medius (superior pelvic tilt of contralateral hip) is absent and we actually observe that there is a downward drop of the unsupported hip- due to unopposed action of gravity.
- This leads to Lurching gait in the patient.

Extra Mile

- Trendelenburg test becomes positive in congenital dislocation of hip/ long standing fracture of neck of femur.
- Inferior gluteal nerve supplies gluteus maximus.

211. Ans. (a) Gluteus medius, minimus

Ref: BDC 6th ed. Vol. II / 69-70; Keith L. Moore 5th ed. / 619-621

Please refer to above explanation.

212. Ans. (c) Genicular branch of obturator nerve

Ref: Netter's Atlas of Neurosciences, 3rd ed. pg. 194

- The capsule of knee joint is supplied by genicular branch of *obturator nerve* which pierces the oblique popliteal ligament.
- The *genitofemoral nerve* mediates the *cremasteric reflex*.

213. Ans. (b) Lateral head of gastrocnemius

Ref: Kulkarni Clinical Anatomy, 2nd ed. pg. 580

- Fabella is a small sesamoid bone present in tendon of origin of lateral *head of gastrocnemius*.

214. Ans. (a) Tibial nerve

Ref: Gray's Anatomy, 41st ed. pg. 1324e1-e2

Points to know about soleus:

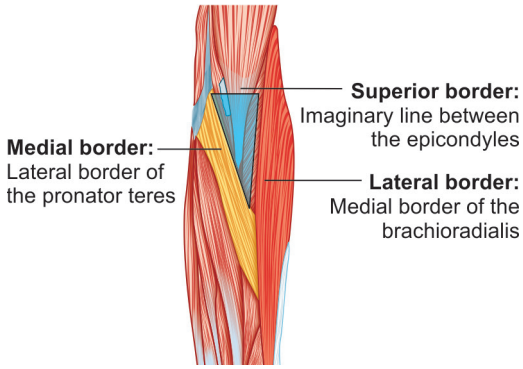
- Soleus muscle is located immediately deep (anterior) to gastrocnemius.
- **Origin:** Upper third of fibula and soleal line of tibia.
- **Insertion:** Inserted with gastrocnemius into calcaneal tendon.
- **Action:** Flexes foot.
- **Nerve supply:** Soleus is innervated by two branches from the tibial nerve, S1 and S2.
- **Vascular supply:**
  - The superior arises from the popliteal artery at about the level of the soleal arch, and
  - The inferior arises from the proximal part of the fibular artery or sometimes from the posterior tibial artery.

- During supination radius rotates laterally and palm faces anteriorly
- During pronation, radius rotates medially and palm faces posteriorly
- This movement takes place around distal radioulnar joint.

177. Ans. (a) Pronator teres

TABLE: Cubital fossa boundaries

Medial boundary	Pronator teres
Lateral boundary	Brachioradialis
Base	Line joining the two epicondyles of humerus
Apex	Point joining lateral and medial boundaries
Floor	Brachialis, supinator
Roof	Skin, superficial fascia *(containing medial cubital vein, lateral and medial cutaneous nerve of forearm)*, deep facia, bicipital aponeurosis



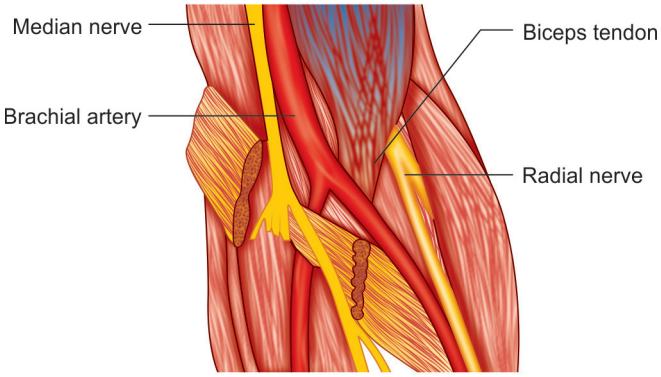
Cubital fossa (Left hand)

178. Ans. (d) Ulnar nerve

Ref: BDC, 6th ed. Vol. I, pg. 94

Contents of Cubital Fossa

- Median nerve
- Brachial artery *(termination and beginning of radial and ulnar arteries)*
- Biceps tendon
- Radial nerve and Radial collateral artery



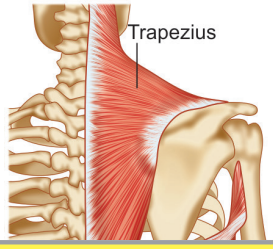
179. Ans. (b) Ulnar nerve

Ref: BDC, 6th ed. Vol. I, pg. 94

180. Ans. (c) Serratus anterior

Ref: Gray's, 41st pg. 749

- **Triangle of auscultation is bounded by:**
  - **Medially:** Trapezius
  - **Laterally:** Scapula
  - **Inferiorly:** Latissimus dorsi



Question 2

The examiner is palpating which artery in the following diagram

(FMGE JULY 2024)

a. Peroneal
b. Posterior tibial
c. Dorsalis pedis
d. Medial plantar

181. Ans. (b) Posterior tibial artery

Ref: BD Chauraisia's Human Anatomy, Volume 2, 8th ed, pg. 132

- The arterial pulse being taken in above picture is of Posterior tibial artery. The posterior tibial pulse can be felt against the calcaneum about 2 cm below and behind the medial malleolus.
- It is palpated in doubtful cases of intermittent claudication where a person gets cramps and severe pain in calf muscles due to lack of blood supply.

182. Ans. (b) Posterior tibial

Ref: Gray's Anatomy, 42nd ed, pg. 1335

- The arterial pulse being taken in above picture is of Posterior tibial artery
- The posterior tibial artery of the lower limb is an artery that carries blood to the posterior compartment of the leg and plantar surface of the foot.
- The posterior tibial pulse can be felt against the calcaneum about 2 cm below and behind the medial malleolus.
- It is palpated in doubtful cases of intermittent claudication where a person gets cramps and severe pain in calf muscles due to lack of blood supply.

158. Ans. (a) Serratus anterior muscle

Ref: BDC, 6th ed. Vol. I, pg. 55-56

159. Ans. (d) Trapezius

Ref: Gray's, 41st ed. pg. 817

Dropped Shoulder Versus Winged Scapula

- The position of the scapula on the posterior wall of thorax is maintained by the tone and balance of the muscles attached to it.
- If one of these muscles is paralyzed, the balance is upset, as in dropped shoulder, which occurs with paralysis of the trapezius or winged scapula caused by paralysis of serratus anterior.

Question 3

A RTA patient has presented to you with features of a nerve injury involving right upper limb. On examination, the patient is able to carry out flexion at metacarpophalangeal joint and extension at interphalangeal joint. The most likely nerve injured here

(FMGE JULY 2024)

a. Ulnar nerve
b. Radial nerve
c. Median nerve
d. Anterior interosseous nerve

161. Ans. (b) Abductor pollicis palsy

Ref: BDC, 6th ed. Vol. I, pg. 109-110, 120

- In ulnar nerve palsy grip is weak due to paralysis of intrinsic muscles *(all interossei, lateral 3rd & 4th lumbricals, hypothenar and adductor pollicis muscles).*
- Sensory supply of ulnar nerve is medial 1½ fingers.
- *Abductor pollicis is supplied by median nerve.*
- **Finger drop** i.e. loss of extension of metacarpophalangeal joint is seen in Radial & Posterior interosseous nerve palsy

Signs of Ulnar Nerve palsy *(remembered as BCDEF)*

- **Book test/Fromet sign:** While holding the book between thumb and rest of hand, there is overaction of flexor pollicis longus due to adductor pollicis nerve palsy.
- **Claw hand:** Clawing of medial 2 digits
- **Card test:** for testing palmar interossei, i.e. adduction of fingers. *(PAD)*
- **aDDuctor pollicis paralysis:** Adduction of thumb lost
- **Egawa's test:** To test dorsal interossei i.e. abduction of fingers *(DAB).*
- **Froment sign**

Extra Mile

- In low ulnar nerve palsy forearm muscles are spared but the clawing is more (as compared to high ulnar n. palsy) this phenomenon is known as ***ulnar paradox.***
- Lower the lesion, more the clawing.

162. Ans. (c) Median nerve

Ref: BDC, 6th ed. Vol. I, pg. 126-127, Vol. I, pg. 109,159; Clinical Anatomy, Vishram Singh/58

- Median nerve is the main nerve of the front of the forearm. It also supplies the muscles of thenar eminence.
- Median nerve aka *labourer's nerve* as it supplies most of the long muscles of the front of forearm.

Extra Mile

- ***Deformities that may occur due to median nerve paralysis:***
  - Carpal tunnel syndrome
  - Pointing index finger
  - Ape thumb deformity aka ape hand deformity
  - Claw hand (median + ulnar)
- ***Deformities that may occur due to radial nerve paralysis***
  - Wrist drop
  - Saturday night palsy
- ***Deformities that may occur due to ulnar nerve paralysis***
  - Ulnar claw hand
  - Cubital tunnel syndrome

163. Ans. (c) Median and ulnar both

Ref: BDC Vol. I, pg. 109,159; Clinical Anatomy, Vishram Singh/58

164. Ans. (c) Median nerve

Ref: BDC Vol. I, pg. 109,159; Clinical anatomy, Vishram Singh/58

- Median nerve is the main nerve of the front of the forearm. It also supplies the muscles of thenar eminence.
- The ape hand deformity or ape thumb deformity of hand is due to paralysis of thenar muscles which is supplied by median nerve.

Presenting Feature of Ape Thumb Deformity

- Thumb is laterally rotated and adducted
- Loss of thenar eminence
- Loss of opposition of thumb

165. Ans. (b) Median nerve

Ref: BDC, 6th ed. Vol. I, pg. 126

- Median nerve is the main nerve of the front of the forearm. It also supplies the muscles of thenar eminence.

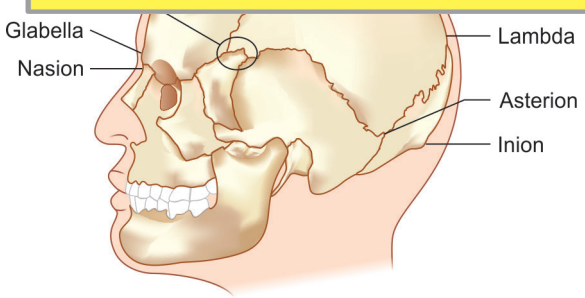
28.

Question 4

Which vessel develops from the left 6th pharyngeal arch artery

(FMGE JULY 2024)

a. Arch of aorta
b. Common carotid artery
c. Subclavian artery
d. Ductus arteriosus



29. Ans. (d) 6

Ref: BD Chaurasia, 7th ed. Vol. I, pg. 87

Blood vessels derived from different arches

Arch	Derived blood vessel
First arch (Mandibular arch)	Maxillary artery
Second arch (Hyoid arch)	Stapedial artery
Third arch	Internal and common carotid artery
Fourth arch	Aortic arch on left side Part of subclavian artery on right side
Sixth arch	• Pulmonary arteries (on each side) • Ductus arteriosus on left side

Contd...

30. Ans. (c) Spleen

Ref: BD Chaurasia, 7th ed. Vol. II, pg. 326

- Spleen develops in the mesoderm in the cephalic part of left layer of dorsal mesogastrium.
- The development occurs in sixth week of intrauterine life.
- Number of nodules develop which soon fuse to form a lobulated spleen.

31. Ans. (b) Pacinian corpuscle

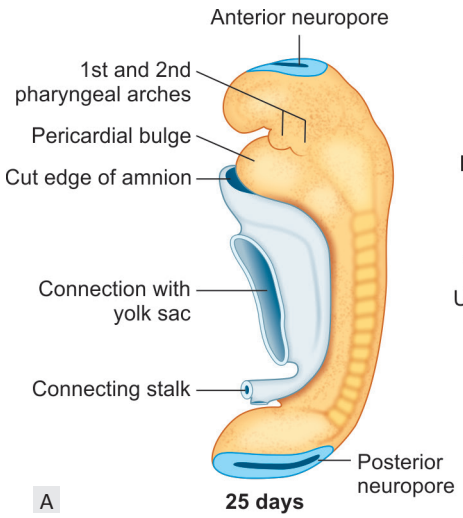
Ref: Gray's Anatomy, 41st ed. pg. 61

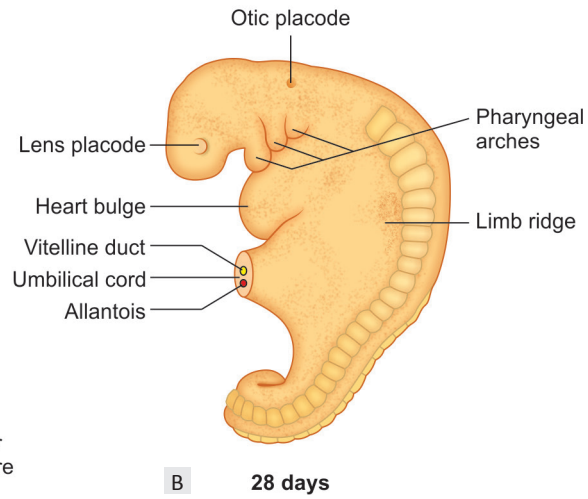
There are 4 types of mechanoreceptors in skin:

• Meissner corpuscles	Fine touch Slow vibration
• Merkel cell	Sensitive to edges and corners
• Pacinian corpuscles	Rapid vibration
• Ruffini's endings	Pressure sensation

32. Ans. (c) Anencephaly

- Cranial (rostral) neuropore closes by day 25
- Caudal neuropore closes by day 28
- Failure of cranial neuropore to close at day 25 results in anencephaly
- Failure of caudal neuropore to close results in spina bifida.





- Pericranium, is the periosteum of the skull bones providing nutrition.

407. Ans. (d) Galea aponeurotica

Ref: BDC, 6th ed. Vol. III, pg. 61-63

408. Ans. (b) Frontal process of maxilla

Ref: BDC, 6th ed. Vol. III, pg. 28

Question 5

At the arrow marked area, the nerve located here is related to which ganglia/which gangliais disturbed due to the involvement of the nerve located at the arrow marked area?

(FMGE JULY 2024)

a. Otic ganglia
b. Pterygopalatine ganglia
c. Ciliary ganglia
d. Submandibular ganglia

409. Ans. (d) Trigeminal nerve

Ref: Gray's, 41st ed. pg. 315-16, 20-21

- ***Muscles of soft palate are supplied by pharyngeal plexus (of cranial accessory & vagus nerves) and mandibular division (V2) of trigeminal nerve.***
- General sensation by lesser palatine branch of maxillary division (V2) of trigeminal nerve & glossopharyngeal nerve.
- Secretomotor parasympathic post ganglionic fibers through lesser palatine nerves (pterygopalatine ganglion) & otic ganglion.
- *Taste by facial nerve (through lesser palatine nerve)*
- Hard palate is supplied by greater palatine & nasopalatine branches of maxillary nerve in place of lesser palatine nerve. All 3 (greater, lesser & naso) palatine nerves pass through pterygopalatine ganglion.
- Palate is supplied by trigeminal (maxillary, mandibular), facial, glossopharyngeal, cranial accessory & vagus nerves.

410. Ans. (a) Genioglossus

Ref: BDC, 5th ed. pg. 252

- Genioglossus is a fan shaped, *bulkiest muscle of tongue*.
- It is originated from upper genial tubercle of mandible and inserted into tip of tongue and into hyoid bone.
- **Function:** It retracts and depresses the tongue. It is also known as life saving muscle because it pulls the posterior part of tongue forwards and protrudes the tongue forwards.

Extra Mile

- **MOTOR:** All the extrinsic and intrinsic muscles of tongue are supplied by hypoglossal nerve; EXCEPT palatoglossus, which is supplied by the cranial root of accessory nerve through the pharyngeal plexus.
- **SENSORY:** Anterior 2/3rd by facial nerve (lingual branch); posterior 1/3rd glossopharyngeal.

Posterior most or valeculla is supplied by vagus nerve.

411. Ans. (d) Posterior cricoarytenoid

Ref: Dhingra, 5th pg. 300

- Posterior cricoarytenoid is the most important muscle of the larynx as it is the only abductor of vocal cord.
- Paralysis of posterior cricoarytenoid will lead to adduction of vocal cord, which may lead to dyspnea resulting in death.

412. Ans. (a) Trachea bifurcates

Ref: BDC, 6th ed. Vol. II, pg. 280-81

- Trachea *begins* at lower border of cricoid cartilage opposite to the *lower border of C6 vertebra.*
- Trachea extends up to upper border of T5
- Tracheal bifurcation (carina) is at T4–T5 level.
- Length of trachea is 10–12 cm
- Thyroid cartilage is over 3, 4 & 5 tracheal rings

At C6 vertebral level: *Landmark is Cricoid cartilage*

- Larynx ends; Trachea begins
- Pharynx ends; Esophagus begins
- Inferior thyroid artery crosses posterior to carotid sheath.
- Middle cervical sympathetic ganglion behind inferior thyroid artery
- Inferior laryngeal nerve enters the larynx.
- Vertebral artery enters the transverse foramen of C6.

413. Ans. (d) C_3 to C_6

Ref: Gray, 41st ed. pg. 586

- In adult male at rest, larynx lies at the level of the bodies of C_3 to C_6 vertebra. Although it is somewhat higher in adult females and children.
- In infants between 6-12 months, the tip of epiglottis (the highest part of the larynx) is a little above the junction of the dens and body of axis (C_2) vertebrae.

414. Ans. (c) Lambdoid suture

Ref: Gray, 41st ed. pg. 418-419

phosphorylation of proteins and altering there activity. For example *cholera toxin increases cAMP levels whereas pertussis toxin inhibits it.*

- IP3: Inositol phosphate diffuses into endoplasmic reticulum and triggers calcium release.
- DAG: Diacyglycerol works with IP3.

59. Ans. (d) Secondary active transport

Ref: Ganong, 25th ed. pg. 48–51

Secondary active transport	Luminal membrane of mucosal cells in small intestine contain a symport that transports glucose into the cell only if sodium binds to protein and transported into cell at the same time
Active transport	Glucose movement from ECF into cytoplasm of the cell *requires carriers and utilises energy* and is called as active transport.
Facilitated diffusion	When *carrier proteins move substances* in the *direction of their chemical or electrical gradients, no energy input is required* and the process is called as facilitated diffusion

60. Ans. (b) Potassium

Ref: Ganong, 22nd ed. BRS Physiology, 4th ed. pg. 11

Ionic Basis of Nerve Resting Membrane Potential

- **RMP:** Resting membrane potential is potential difference across the cell membrane in millivolts, ***which is by convention –70 mV.***
- RMP is established by diffusion potential that results from concentration differences of permeable ions.
- Resting membrane potential (–70 mV) is close to equilibrium potential of K^+ and Cl^- (both-85 mV) and far from the equilibrium potential of Na^+ (+65 mV). ***That means at rest the nerve membrane is more permeable to K^+ than Na^+***
- Na+ is actively transported out of neurons and other cells and K^+ is actively transported into cells, ***but because K^+ permeability at rest is greater than Na^+ permeability, K^+ channels maintain the resting membrane potential.***

61. Ans. (b) Decrease membrane stability of nerves

Ref: Ganong's, 22nd ed. chapter 2.

- A *decrease in extracellular Ca^{++}* concentration *increases the excitability of nerve* and muscle cells by decreasing the amount of depolarization necessary to initiate the action potential.
- Conversely, an increase in extracellular Ca^{++} concentration "stabilizes the membrane" by decreasing excitability.

62. Ans. (d) Acetylcholine

Ref: Ganong's, 25th ed. pg. 259, 266

- Acetylcholine is released at the nerve terminal of all preganglionic neuron, postganglionic parasympathetic ganglion and a few postganglionic sympathetic ganglion(e.g.: Sweat gland and sympathetic vasodilator fibers). The remaining sympathetic postganglionic neu-

Question 6

50 year old male patient complains of muscle cramps and weakness, Physician decides to investigate the RMP. What is the typical value of RMP of muscle cells?

(FMGE JULY 2024)

a. -90mv
b. -50mv
c. +90mv
d. -70mv

64. Ans. (d) –12 mV

- Skeletal muscle cells: –95 mV
- Smooth muscle cells: –50 mV
- Astrocytes: –80/–90 mV
- Neurons: –70 mV
- Erythrocytes: –10 to –12 mV

65. Ans. (b) B fibers

Ref: Miller's Anesthesia pg. 77

- In case of hypoxia, first nerve fiber affected is B fibers.
- Nerve fibers in decreasing order of susceptibility in different situations:
  - **Pressure:** A-B-C *(fiber A is most susceptible followed by B and then C in case of Pressure)*
  - **Local anesthetics:** A-B-C *(fiber A is most susceptible followed by B and C in case of LA)*
  - ***Hypoxia: B-A-C*** *(fiber B is most susceptible followed by A and then C in case of Hypoxia)*
- ***Remember:*** *A and B fibers are Myelinated and C fibers are unmyelinated.*

86. Ans. (c) Alcohol

Ref: Ganong, 25th ed./Table 38-1 pg. 696

Factors Affecting Vasopressin Secretion

Increased vasopressin secretion	Decreased vasopressin secretion
• Increased effective osmotic pressure of plasma • Decreased ECF volume • Pain, emotion, stress Nausea vomiting • Tumours leading to SIADH-oat cell cancer of lung, • Carcinoid tumours	• Decreased effective osmotic pressure of plasma • Increased ECF volume • Alcohol

87. Ans. (b) Carbonic acid

Ref: Ganong, 25th ed. pg. 717; Indu Khurana

Buffers in whole blood

Buffer Type	Buffering capacity (%)
Haemoglobin	35%
Bicarbonate	53% (plasma 35% + RBC 18%)
Organic phosphates	3%
Plasma protein	7%
Inorganic	2%

Most abundant buffer in the body is proteins.
Most important buffer in the body is bicarbonate.

88. Ans. (b) Proximal convoluted tubular cells

Question 7

What is the typical Glomerular Filtration Rate (GFR) value in a healthy adult?

(FMGE JULY 2024)

a. 125ml/min
b. 200ml/min
c. 100ml/min
d. 150ml/min

89. Ans. (a) 20%

Ref: Guyton's Physiology, 11th ed. pg. 316

- *GFR Is About 20 Per Cent of the Renal Plasma Flow.*
- In an average adult GFR is about 125 ml/min, or 180 L/day.
- Renal plasma flow is 650 ml/min
- The *filtration fraction* is calculated as follows: GFR/Renal plasma flow
- Therefore, $\frac{125 \text{ ml/min}}{650 \text{ ml/min}} = 0.2$
- The fraction of the renal plasma flow that is filtered (the filtration fraction) averages about 0.2; this means that about 20 per cent of the plasma flowing through the kidney is filtered through the glomerular capillaries.

Extra Mile

- The entire plasma volume is only about 3 liters, whereas the GFR is about 180 L/day, the entire plasma can be filtered and processed about 60 times each day.

90. Ans. (a) Aldosterone in collecting ducts

Ref: Guyton, 10th ed. pg. 290, 304

Hormones and their site of Action

Hormones	Site of action in kidney
Angiotensin II	Constricts afferent arterioles, helps to reduce GFR
Aldosterone	Cortical collecting duct & distal tubules
ADH	Medullary collecting duct
ANP	Collecting duct

91. Ans. (a) Collecting duct

Ref: Ganong, 23rd ed. pg. 648

- Aldosterone is secreted from adrenal cortex.
- Action of aldosterone is localized to distal tubule and collecting duct.
- Mechanism: Stimulates Na^+K^+ ATPase at basolateral end, which generate gradient for movement of sodium ion from apical membrane causing an increase in sodium reabsorption.

92. Ans. (b) HCO_3

Ref: Ganong, 25th ed. pg. 641-44

- CO_2 is transported in blood in 3 forms:
  1. **As HCO_3-** CO_2 is **mainly transported** in bicarbonate form ~ 70%. When CO_2 diffuses into RBC, it reacts chemically with water and with help of enzyme carbonic anhydrase it is converted into $HCO_3^- + H^+$
     $CO_2 + H_2O \rightarrow HCO_3 + H^+$
  2. **As dissolved CO_2:** 6–7% of CO_2 transport
  3. **As carbamino compound of Hb and other plasma proteins**: 20% of CO_2 transport.

93. Ans. (d) Sensing of NaCl concentration in macula densa

Ref: Guyton, 11th ed. pg. 323-324

- To perform the function of auto regulation, the kidneys have a feedback mechanism known as tubulo-glomerular feedback which links changes in sodium chloride concentration at the macula densa (tubular component) with the control of renal arteriolar resistance.

231. Ans. (a) Increase in rate of transmission

Ref: Ganong, 25th ed. pg. 545

Effect on heart rate = Chronotropic action
Effect on force of contraction = Inotropic action
Effect on rate of transmission = Dromotropic action

232. Ans. (b) C wave is called as dicrotic notch

Ref: Ganong, 25th ed. pg. 542

A wave	Atrial systole
C wave	Bulge of tricuspid valve into right atrium during isovolumetric contraction
X descent	Atrial relaxation
V wave	Beginning of isovolumetric relaxation
Y descent	Ventricular relaxation

Dicrotic Notch is seen in Pulse recording.

233. Ans. (a) Fluctuation in BP with respiration

Ref: Textbook of Medical Physiology, 2nd ed. pg. 435

Traube Hering Waves are oscillations in BP that occur with a frequency of 4/min, and are attributable to rhythmic oscillations in intensity of sympathetic vasomotor discharge.

TRAUBE–HERING WAVES

These are formed by fluctuation in BP synchronous with respiration. The wave shows a rise in pressure during inspiration and a fall during expiration. *These waves are produced due to change in vagal and sympathetic activity in different phases of respiration*. The vasomotor center is stimulated during inspiration by the irradiation of impulses from the inspiratory centers which causes rise in blood pressure. Also during expiration, the intrathoracic pressure becomes less negative, therefore venous return decreases which in turn decreases cardiac output and BP.

Extra Mile

- **Traube semilunar space:** A crescentic space about 12 cm wide, just above the costal margin.
- **Traube sign:** A murmur heard in auscultation over arteries in significant aortic regurgitation.

234. Ans. (c) Venule

Ref: Ganong, 25th ed. pg. 568

- Maximum cross sectional area is of capillaries. But it is *not* given in choices.
- The second most extensive cross sectional area is of venules.
- *However the maximum of percentage of blood volume is in venules + veins and vena cava and constitutes 54% of total blood volume contained.*

Vessel	Cross sectional area	% of blood volume contained
Capillary	4500 cm^2	5%
Venule	4000 cm^2	54%
Arteriole	400 cm^2	1%
Artery	20 cm^2	8%
Aorta	4.5 cm^2	2%

235. Ans. (c) 15 seconds

Ref: Ganong, 25th ed. pg. 573

The normal arm to tongue circulation time is 15 seconds and is measured by injecting a bile salt preparation into the arm vein and timing when the bitter taste will appear in the tongue of the patient.

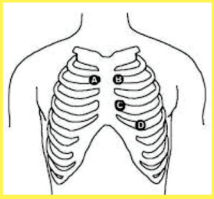
CNS AND PNS PHYSIOLOGY

Question 8

Arrange the following in order:

(FMGE JULY 2024)

a. 1= Aortic area, 2 = pulmonic area, 3 = Tricuspid area, 4 = Mitral area
b. 1= Pulmonic area, 2 = Aortic area, 3= Mitral area, 4 = Tricuspid area
c. 1= Aortic area, 2 = Mitral area, 3 = puImonic area, 4 = Tricuspid area
d. 1= Aortic area, 2 = Pulmonic area, 3= mitral area, 4= Tricuspid area



237. Ans. (a) 1 = Aortic area, 2 = Pulmonic area, 3 = Tricuspid area, 4 = Mitral area

Ref: Berne and Levy Physiology, 6th ed. pg. 490

- Heart auscultation is usually performed with the patient sitting up or reclined at about 45 degrees.
- *Aortic area:* Right second intercostal space close to the sternum is where the ascending aorta is nearest to the thoracic cage.
- *Pulmonary area:* Left second intercostal space close to the sternum is where the infundibulum is closest to the thoracic cage.
- *Tricuspid area:* Lower left sternal edge is the point closest to the valve in which heart auscultation is possible.
- *Mitral area:* At the apex beat, as the left ventricle is closest to the thoracic cage.

238. Ans. (a) Ascending sensory and descending motor pathways in spinal cord

Ref: Ganong 26th ed. pg. 168

291. Ans. (a) Liver

Sites of Haematopoiesis

Yolk sac at 2 weeks	Earliest Hemoglobin to be formed is Gower 1. This is followed by Gower 2 and finally Portland.
In fetus in liver and partly spleen.	HbF appears at 14 weeks
At birth it shifts to the bone marrow	HbA appears at 38 weeks

292. Ans. (b) Solubilization of glucose

Ref: Harper, 26th pg. 584

- Bilirubin formed in peripheral tissues is transported to the liver by plasma albumin
- Smaller amounts of cortisol and other hormones are bound to albumin.

Question 9

What physiological response is most likely to occur in a person exposed to high temperatures while exercising vigorously to maintain internal body temperature within a narrow range?

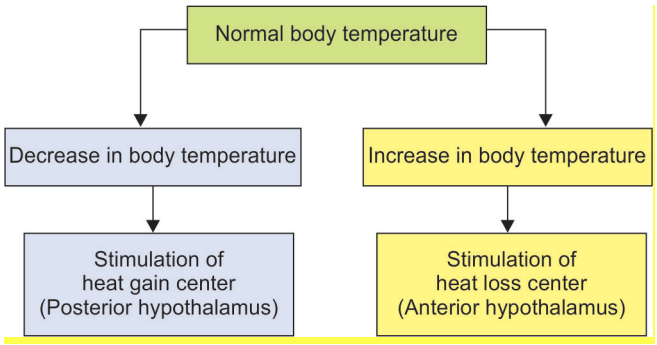
(FMGE JULY 2024)

a. Sweating and vasodilation in skin
b. Shivering and vasoconstriction in skin
c. Increased production of heat by liver
d. Decreased HR and RR

294. Ans. (b) Stimulation of fibers coming from posterior hypothalamus

Ref: Essentials of Medical Physiology, 6th ed. pg. 362

- The hypothalamus is said to integrate body temperature information from sensory receptors (primarily cold receptors) in the skin, deep tissues spinal cord, extra-hypothalamic portions of the brain, and the hypothalamus itself.
- *The reflex responses activated by cold are controlled from the posterior hypothalamus.*
- Those activated by warmth are controlled primarily from the anterior hypothalamus.



- Stimulation of the anterior hypothalamus causes cutaneous vasodilation and sweating, and lesion in this region cause hyperthermia, with rectal temperatures sometimes reaching 43°C (109.4°F).
- The threshold is >37°C for sweating and vasodilation, 36.8°C vasoconstrictions 36°C for non-shivering thermogenesis, and 35.5°C for shivering.

295. Ans. (c) Angiotensin converting enzyme

- The lungs activate the physiologically inactive decapeptide angiotensin I to the pressor, aldosterone-stimulating octapeptide angiotensin II in the pulmonary circulation. The reaction occurs in other tissues as well, but it is particularly prominent in the lungs.
- Large amounts of the angiotensin-converting enzyme responsible for this activation are *located on the surface of the endothelial cells of the pulmonary capillaries.*

60 mg of tryptophan $\xrightarrow{\text{Vit B6}}$ 1 mg of Niacin.

- **In** deficiency of vitamin B6, the pathyway altered and leads to formation of xanthuric acid. **Thus XANTHURIC ACID IS THE INDEX OF VITAMIN B6 DEFICIENCY.**
- **Sulphur containing amino acid: CYSTEINE AND METHIONINE**
- **BASIC AMINO ACID:**
  - HISTIDINE
  - LYSINE
  - ARGININE (*most basic amino acid*)
- Most stable amino acid at physiologic pH: **HISTIDINE**

Question 10

A 16-year old patient happens to have pellagra like eruptions on skin in spring season from last 5 years with normal HIAA and high aminoaciduria. Indole levels in urine are normal. What is the probable diagnosis?

(FMGE JULY 2024)

a. Carcinoid tumor
b. Nutritional pellagra
c. Hartnup disease
d. Essential fructosuria

201. Ans. (b) Maple syrup disease

Ref: Harper's Biochemistry, 30th ed. 309, 27th ed. pg. 257

- Branched chain amino acids are remembered as VIL (Valine, Isoleucine, **Leucine**).
- These amino acids are converted to alpha-keto acid and then undergo oxidative decarboxylation by ***enzyme alpha keto-decarboxylase.*** *Deficiency of this enzyme leads to MSUD, which is characterized by burnt sugar or maple syrup smell in urine or sometimes in ear wax also.*
- In patients with deficiency of alpha keto-decarboxylase enzyme, there is **increased concentration of valine, Isoleucine and Leucine.**
- **Management** is done by restricted dietary intake of branched chain amino acid.

Extra Mile

Diseases and Deficiency
- **HARTNUP DISEASE:** TRYPTOPHAN
- **ALKAPTONURIA:** Homogentisate oxidase
- **ALPORT SYNDROME:** due to antibody against type IV collagen.

202. Ans. (c) Tryptophan

Ref: Harper's Biochemistry, 30th ed. pg. 281, 544

Food item	Limiting amino acids
• ***Pulses***	Methionine & cysteine
• ***Cereals***	Threonine & Lysine
• ***Maize***	Tryptophan & lysine

203. Ans. (c) Homogentisate oxidase

Ref: Harper's Biochemistry, 30th ed. pg. 304

The defect in Alkaptonuria is lack of homogentisate oxidase. Most imp features are:

- The urine darkens on exposure to air due to oxidation of excreted homogentisate.
- Deposits called ochronosis occur in sclera, ear, nose, cheeks, intervertebral disc space. There may be calcification of inter vertebral discs.
- **Ochronosis arthritis**- affects shoulder, hip and knee.
- **Benedicts reaction is strongly positive and gives green brown precipitate.**
- **Fehling test** reagent gives blue green color.

204. Ans. (a) Kynerunine

Ref: Harper's Biochemistry, 30th ed. pg. 306-307

- Tryptophan is degraded to amphibolic intermediates via the kynurenine-anthranilate pathway. Tryptophan oxygenase (tryptophan pyrrolase) opens the indole ring, incorporates molecular oxygen, and forms N-formyl kynurenine.
- ***Hydrolytic removal of the formyl group of N-formylkynurenine, catalyzed by kynurenine formylase, produces kynurenine.***
- Since kynureninase requires pyridoxal phosphate, excretion of xanthurenate in response to a tryptophan load is diagnostic of vitamin B_6 deficiency.
- Hartnup disease reflects impaired intestinal and renal transport of tryptophan and other neutral amino acids.

205. Ans. (d) Aspartate

Ref: Harper's Biochemistry, 30th ed. pg. 294-95

$NH_3 + HCO_3 +$ Aspartate $+ 3ATP \rightarrow$ Urea + Fumarate + 2 ADP + AMP + 4 P.

UREA CYCLE

- Urea Is the Major End Product of Nitrogen Catabolism in Humans
- Some reactions of urea synthesis occur in the matrix of the mitochondrion, other reactions in the cytosol
- *Synthesis of 1 mol of urea requires 3 mol of ATP plus 1 mol each of ammonium ion and of the amino nitrogen of aspartate.*

- Different types of mutations in HGPRTase gene have been identified in patients with Lesch-Nyhan syndrome.
- The disease is characterized by **self-mutilation**, (biting of lips and fingers), mental retardation, excessive uric acid production leading to hyperuricemia. The hyperuricemia frequently results in the formation of uric acid stones in the kidneys and deposition of urate crystals in the joints (gout)

103. Ans. (b) Nucleotide excision repair

Ref: Lippincott's Illustrated Reviews, 6th ed. pg. 606

Xeroderma Pigmentosum is an autosomal recessive genetic condition, commonly caused due to mutation in nucleotide excision repair enzymes.

104. Ans. (a) X-linked recessive

- X-linked recessive diseases most often occurs in males. Males have only one X chromosome. A single recessive gene on that X chromosome will cause the disease.
- Y chromosome doesn't contain most of the genes of the X chromosome, so it doesn't protect the male.
- Example: Hemophilia, Duchenne muscular dystrophy.

105. Ans. (a) RNA amplification

Ref: Lippincott's Illustrated Reviews, Biochemistry 7th ed. pg. 485

- Reverse transcriptase (RT) is an enzyme used to generate complementary DNA (cDNA) from an RNA template, a process termed reverse transcription.
- Reverse transcriptases are used by certain viruses such as HIV and the hepatitis B virus to replicate their genomes, by retrotransposon mobile genetic elements to proliferate within the host genome, and by eukaryotic cells to extend the telomeres at the ends of their linear chromosomes.
- In retroviruses and retrotransposons, cDNA can then integrate into the host genome, from which new RNA copies can be made via host-cell transcription.
- The same sequence of reactions is widely used in the laboratory to convert RNA to DNA for use in molecular cloning, RNA sequencing, polymerase chain reaction (PCR), or genome analysis.

106. Ans. (c) Adenine – Guanine and Cytosine – Thiamine

Ref: Lippincott's Illustrated Reviews, Biochemistry 7th ed. pg. 411-13

- Adenine, thymine, cytosine and guanine are the four nucleotides found in DNA.
- Traits as diverse as the color of a person's eyes and the scent of a rose are determined by the information contained in DNA.

Question 11

A couple presents to the OPD with their 4 year old child who has self mutilating behaviour and poor growth. Identify the condition and enzyme involved in it?

(FMGE JULY 2024)

a. HGPRTase deficiency
b. Homogentisic Acid oxidase
c. Phenylalanine Hydroxylase
d. Benzoyl Acidase

107. Ans. (b) Lesch Nyhan syndrome

Ref: Harrison's 20th ed. pg. 3001

Lesch Nyhan Syndrome

- XLR condition
- Occurs due to complete deficiency of HGPRTase enzyme → accumulation of purine
- Degradation of purine → Increased uric acid
- The syndrome is characterized by hyperuricemia, nephrolithiasis, obstructive uropathy, self-mutilative behaviour, choreoathetosis, spasticity, and mental retardation.

Extra Mile

- Partial deficiency of HGPRTase enzyme → Kelley-Seegmiller syndrome.
  - Associated with hyperuricemia, nephrolithiasis, obstructive uropathy but low IQ central nervous system manifestations.

108. Ans. (c) AUG

Ref: Lippincott's Biochemistry, 6th ed. pg. 457 - 458

- Initiator codon in eukaryotes: **AUG** (codes for methionine)
- Initiator codon In prokaryotes: **AUG** (codes for N-Formyl methi-onine)
- **Stop codons:**
  - **UAG:** Amber
  - **UGA:** Opal
  - **UAA:** Ochre

109. Ans. (c) Denature of DNA → Annealing of primers → Extension of primer

Ref: Lippincott's Biochemistry 6th ed. pg. 480 – 81

Steps in PCR cycle:

- **DNA denaturation:** DNA to be amplified is heated → to separate dsDNA into single strands
- **Annealing of primers:** Separated ssDNA cooled → allowed to anneal to 2 primers
- **Extension of primer:** New chain synthesis which is complimentary to original DNA chains.

Steps	Temperature	Time (sec)
Denaturation	90°–96°C	20–60 sec
Annealing	50°–70°C	20–90 sec
Extension	68°–75°C	10–60 sec

derived from wood, and is an integral part of the secondary cell walls of plants.

218. Ans. (b) Histidine

Ref: Harper's Biochemistry, 30th ed. pg. 340-42

- N1 of purine is derived from amino group of aspartate
- N3 & N9 are obtained from amide group of glutamine
- C4, C5, & N7 of the purine ring of nucleotides are contributed by glycine.

219. Ans. (b) Glycine

Ref: Harper's Biochemistry 30th ed. pg. 325-27; 26th/ 264

- **Glycine** is required for the biosynthesis of **heme**, **purines** and **creatine** and is conjugated to **bile acids**.
- **Serine** is required for the **phospholipid** and **sphingosine** synthesis apart from **purines** and **thymine**.
- **S-Adenosyl methionine** (the methyl group donor) for many biosynthetic processes, also participates directly in **spermine and spermidine** synthesis.

220. Ans. (d) All of these

Ref: Harper's Biochemistry 30th ed. pg. 22-23, 748

- *Glutathione (GSH) is a tripeptide with a gamma peptide linkage between the amine group of cysteine (which is attached by normal peptide linkage to a glycine) and the carboxyl group of the glutamateside-chain.*
- It is an antioxidant, preventing damage to important cellular components caused by reactive oxygen species such as free radicals and peroxides.

221. Ans. (a) Proline to hydroxyproline

Ref: Harper's Biochemistry, 30th ed. pg. 47, 562

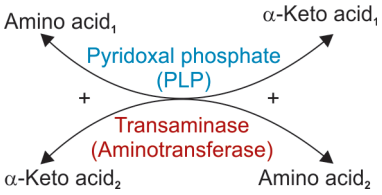
- *Ascorbic acid is needed for a variety of biosynthetic pathways, by accelerating hydroxylation and amidation reactions.*
- In the synthesis of collagen, ascorbic acid is required as a cofactor for following enzymes:
  - Prolyl hydroxylase
  - Lysyl hydroxylase
- ***These two enzymes are responsible for the hydroxylation of the proline and lysine amino acids in collagen.***
- ***Remember,*** *Hydroxyproline and hydroxylysine are important for stabilizing collagen by cross-linking the propeptides in collagen.*
- Clinical effects if there is defective collagen fibrillogenesis:
  - Impaired wound healing.
  - Impaired bone bormation
  - Abnormal bleeding due to fragile capillaries.

222. Ans. (b) Proline

Ref: Harper's Biochemistry, 30th ed. pg. 141, 298-99

- Proline is the amino acid which changes the conformation of the alpha helix in collagen due to the nature of proline having a cyclical structure. It also forms the ends of the beta sheets in the secondary structures.

223. Ans. (a) Pyridoxal phosphate



- Transamination involves reversible transfer of alpha amino group of alpha amino acid to an alpha-keto-acid to form a new amino acid and a new keto-acid.
- Enzyme catalyze this reaction is called transaminase (aminotransferase)
- All transaminase require **pyridoxal phosphate (Vit B6)**

Question 12

This condition is treated by supplementation of which of the following?

(FMGE JULY 2024)

a. Niacin
b. Vitamin A
c. Vitamin E
d. Vitamin C

VITAMINS, MINERALS AND ENZYMES

224. Ans. (a) Niacin

Ref: Lippincott's Illustrated Reviews, 6th ed. pg. 532

- The image shows Casal's necklace pattern, which is seen in Pellagra.
- It is caused by deficiency of Vitamin B3 commonly known as **Niacin.**
- It involves skin, gastrointestinal tract, and CNS
- The symptoms of pellagra progress through the three Ds: dermatitis, diarrhea, and dementia. If untreated, death (a fourth D) occurs.

225. Ans. (d) Vitamin B_6

Ref: Lippincott's Illustrated Reviews, 6th ed. pg. 529

- Vitamin B_6 is the only water-soluble vitamin with significant toxicity.
- Neurologic symptoms (sensory neuropathy) occur at intakes above 500 mg/day.
- Symptoms include pain, tingling sensation, pins-and-needles sensation, numbness and weakness.

- This protein is highly expressed in the **enterocytes in the duodenum and jejunum.** Therefore, affected individuals have a decreased ability to absorb zinc from dietary sources. Absence of a binding ligand needed to transport zinc may further contribute to zinc malabsorption.
- **Clinical manifestations include** diarrhea, alopecia, muscle wasting, depression, irritability, and a rash involving the extremities, face, and perineum. The rash is characterized by vesicular and pustular crusting with scaling and erythema.
- Features of acrodermatitis enteropathica **start appearing in the first few months of life,** if mother discontinues breast milk.

TABLE: Deficiency and toxicity of several metals

Element	Deficiency	Toxicity
Boron	No biologic function determined	Developmental defects, male sterility, testicular atrophy
Calcium	Reduced bone mass, osteoporosis	Renal insufficiency (milk-alkali syndrome)[Q] nephrolithiasis, impaired iron absorption, thiazide diuretics.
Copper	Anemia, growth retardation, defective keratinization and pigmentation of hair, hypothermia, degenerative changes in aortic elastin[Q], osteopenia, mental deterioration.	Nausea, vomiting, diarrhea, hepatic failure, tremor, mental deterioration, hemolytc anemia, renal dysfunction
Chromium	Impaired glucose tolerance[Q]	*Occupational*;Renal failure, dermatitis, pulmonary cancer
Fluoride	↑Dental caries[Q]	Dental and skeletal flurosis[Q], osteosclerosis
Iodine	Thyroid enlargement, ↓T_4 cretinism	Thyroid dysfunction, acne-like eruptions[Q].
Iron	Muscle abnormalities, koilonychia, pica anemia, ↓work performance, impaired cognitive development, premature labor, ↑perinatal maternal death	Gastrointestinal effects, (nausea, vomiting, diarrhea, constipation), iron overload with organ damage, acute and chronic systemic toxicity, increased susceptibility to malaria, increased risk association with certain chronic diseases (e.g. diabetes)
Manganese	Impaired growth and skeletal development reproduc-tion, lipid and carbohydrate metabolism, upper body rash	*General:* Neurotoxicity, Parkinson-like symptoms[Q] *Occupational*: Encephalitis like syndrome, Parkinson like syndrome, psychosis, pneumoconiosis.
Molybdenum	Severe neurologic abnormalities	Reproductive and fetal abnormalities
		General: Alopecia , nausea, vomiting, abnormal nails, emotional
	ess, nfusion,	Hyperphosphatemia
	re to ns.	General: Reduced copper, absorption, gastritis, sweating fever,nausea, vomiting *Occupational;* Respiratory distress, pulmonary fibrosis

Question 13

Mechanism of action of diphtheria toxin?

(FMGE JULY 2024)

a. Increasing CAMP
b. Increasing CGMP
c. ADP ribosylation of EF2- decreasing protein synthesis
d. decreasing 605 ribosome

277. Ans. (c) ADP-ribosylation of Gs alpha sub-unit

Ref: Harper's Biochemistry, 30th ed. pg. 250

Cholera Toxin Acts by the Following Mechanism

- The B subunit ring of the cholera toxin binds to GM1 gangliosides on the surface of target cells. Once bound, the entire toxin complex is endocytosed by the cell and the cholera toxin **A1 (CTA1) chain is released** and leads to ADP ribosylation of G_s subunit massive fluid efflux in GI lumen.
- *Cholera toxin ADP-ribosylates G proteins, causing* ↑cAMp and *massive fluid secretion from the lining of the small intestine, resulting in life-threatening diarrhea.*
- ADP-ribosylation is also responsible for the actions of some bacterial toxins, such as cholera toxin, diphtheria toxin, pertussis toxin, and heat-labile enterotoxin.

- **CURE International** is a global nonprofit network of children's hospitals that provide surgical care in a compassionate, gospel-centered environment.

12. Ans. (d) 24–28 weeks

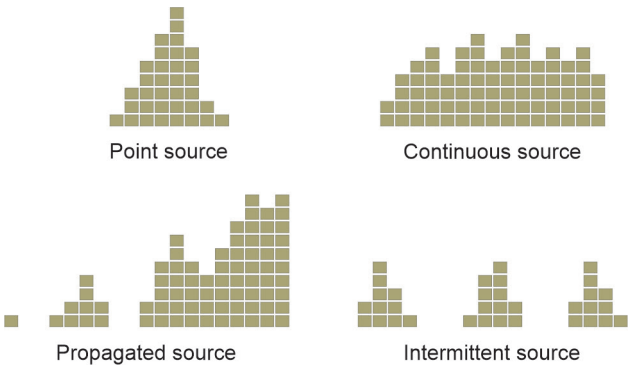
- Screening for GDM is usually done at 24-28 weeks of gestation because insulin resistance increases during the second trimester and glucose levels rise in women who do not have the ability to produce enough insulin to adopt this resistance.

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 421

13. Ans. (d) Propagated epidemic

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 73

- **Propagated (or progressive source) epidemic:** A single index case who infected a number of other individuals. One or more of the people infected in the initial wave infected a group of people who become the second wave of infection. So here transmission is person-to-person, rather than from a common source. Propagated epidemic curves usually have a series of successively larger peaks, which are one incubation period apart. For example, COVID-19 cases, SARS
- **Point source outbreaks (epidemics)** involve a common source, such as contaminated food or an infected food handler, and all the exposures tend to occur in a relatively brief period. Consequently, point source outbreaks tend to have epidemic curves with a rapid increase in cases followed by a somewhat slower decline, and all of the cases tend to fall within one incubation period.
- **Continuous common source epidemics** may also rise to a peak and then fall, but the all the cases do not occur within the span of a single incubation period. This implies that there is an ongoing source of contamination.



14. Ans. (a) Rashtriya Bal Swasthya Karyakram

- **Rashtriya Bal Swasthya Karyakram (RBSK)** is an initiative aimed at screening children from 0 to 18 years for the 4 Ds - Defects at birth, Diseases, Deficiencies and Development Delays including Disabilities. Children diagnosed with illnesses shall receive follow up including surgeries at Govt and Pvt Hospital level, free of cost under NHM.
- **Janani Suraksha Yojana (JSY)** is a safe motherhood intervention under the National Rural Health Mission (NHM). It is being implemented with the objective of

Question 14

Wasting in a child is assessed by which of the following measures?

(FMGE JULY 2024)

a. Weight-for-height
b. Weight-for-age
c. Height-for-weight
d. Height-for-age

15. Ans. (a) Stunting

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 696

- Child **stunting** refers to a child who is too short for his or her age (<-2SD) and is the result of chronic or recurrent malnutrition. Stunting is a contributing risk factor to child mortality and is also a marker of inequalities in human development.
- Option b: **Wasting** is an indicator of acute malnutrition. It indicates recent and severe weight loss, because a person has not had enough food to eat and/or they have had an infectious disease, such as diarrhea, which has caused them to lose weight.
- Option c: **Constitutional delay** of growth and puberty is a transient state of hypogonadotropic hypogonadism associated with prolongation of childhood phase of growth, delayed skeletal maturation, delayed and attenuated pubertal growth spurt, and relatively low insulin-like growth factor-1 secretion.

16. Ans. (a) <11.5

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 604

- **Severe Acute Malnutrition (SAM)** is defined by very low weight-for-height/length (Z- score below -3 SD of the median WHO child growth standards), or a mid-upper arm circumference < 115 mm, or by the presence of nutritional edema.

FMGE SOLUTIONS

6. Ans. (c) General Fertility Rate

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 539

$$= \frac{\text{No. of live births during the year}}{\text{Midyear female population aged 15–49 years in the same area and year}} \times 1000$$

Option a: Total fertility rate: It is the average number of children a woman would have if she were to pass through her reproductive years, bearing children at the same rate as the woman now in each age group.
Option b: Age specific fertility rate: It is the number of the live births in a year to 1000 women in any specified age-group.
Option d: Net reproduction rate: It is defined as the number of daughters a new-born girl will bear during her lifetime, assuming fixed age specific fertility and mortality rates.
Gross reproduction rate: Number of girl live birth per female in age group of 15-49 years.

7. Ans. (b) Yellow - Stable need observation

Ref: Park's textbook of Preventive and Social Medicine, 25th ed. pg. 856

Triage color coding:

Red	• Patient requires immediate treatment • E.g. suicide attempt via poisoning, hanging, or self-inflicted trauma
Yellow	• Patient is stable at the moment and is not in any immediate danger, but will require observation • E.g. passive suicidal ideation, command hallucinations
Green	• Patients who will require medical treatment at some point, once more critical injuries have been treated • E.g. drug refill for anti-depressant or anti anxiety medications
Black	• For those who are already decreased, or for patients whose injuries are so extensive that they will not be able to survive, given the level of care available

8. Ans. (a) 2 lakh IU orally every 6 months

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 672

Vit-A supplementation for children in endemic areas

Age	Dose	Frequency
<6 months	50,000 IU	Once
6–11 months or weight <8 kg	1,00,000 IU	Once
1–5 years or weight >8 kg	2,00,000 IU	Every 6 months till 5 years of age

Question 15

For what population size is an urban Primary Health Centre (PHC) typically intended?

(FMGE JULY 2024)

a. 1 per 50,000
b. 1 per 100,000
c. 1 per 250,000
d. 1 per 200,000

9. Ans. (d) Subcenter

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 513

- The subcenter is the peripheral outpost of the Indian healthcare system. One subcenter caters to the healthcare needs of 5000 population in general and 3000 population in hilly, tribal and backward areas.
- Inclusions in urban health care (From base to top).

Inclusions in UHC	Population that it caters
• Mahila Arogya Samiti	150–500
• ASHA	1000–2500
• ANM	10,000
• Urban PHC	50,000
• Urban CHC	2.5 lakh

10. Ans. (d) Mean will increase, median will remain the same

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 908

- There are three measures of central tendency, namely mean, median and mode.
- Mean is the average value and is statistically the best measure of central tendency.
- Median is the middle value when the data set is arranged in ascending or descending order.
- Mode is the highest occurring value
- When 39 is mistaken for 93, mean value will increase; median remains same.

11. Ans. (d) FORD

Ref: Park's Textbook of Preventive and Social Medicine, 25th ed. pg. 817

- American automobile major, **Ford Motor** Company has announced that it is funding $200,000 (Rs 1.26 crore), for supporting two international social projects that aim to improve health and sanitation conditions in India and Mexico, as part of the Bill Ford Better World Challenge (BFBWC).
- Main works by this foundation is:
  - Making sanitary latrines
  - NIHAE: National Institution for health Administration and Education
  - Calcutta drainage system

Extra Mile

- The **USAID Global Health Supply Chain Program**-Procurement and Supply Management (GHSC-PSM) project enhances the health care experience in the communities we serve through transformative supply chain solutions.

Contd...

FMGE SOLUTIONS

32. Ans. (a) >10 sq. ft

Ref: Park's Textbook of Preventive and Social Medicine 25th ed. pg. 664

- Per capita space in school should be greater than 10 sq. ft per student.
- Sufficient space is important to ensure the comfort and well-being of students, allowing them to move freely and engage in various activities.
- Adequate space also helps in preventing overcrowding and the spread of infectious diseases in school settings.

33. Ans. (b) Fluorine

Ref: Park's Textbook of Preventive and Social Medicine 25th ed. pg. 733

- Over-supplementation of fluorine can lead to dental fluorosis, which is characterized by white or brownish patches on the teeth, particularly on the enamel of the anterior incisors.
- Excessive intake of fluoride, whether through drinking water, dietary sources, or supplements, can cause fluorosis, affecting the appearance and strength of tooth enamel.

Extra Mile

Vitamin A
- Excessive intake can cause symptoms like nausea, vomiting, blurred vision, bone pain, hair loss, and skin changes. High doses during pregnancy can increase the risk of birth defects and liver toxicity.

Chlorine
- High levels can irritate the respiratory system, causing coughing, wheezing, and chest tightness.
- Prolonged exposure can result in skin and eye irritation, and there may be potential cancer risks associated with long-term exposure.

Riboflavin
- Overconsumption may cause gastrointestinal disturbances such as diarrhea and stomach cramps.
- It can increase sensitivity to light and interfere with certain laboratory test results.

Question 16

Penicillin inj for treatment of Rheumatic Heart Disease is which level of

(FMGE JULY 2024)

a. Primordial prevention
b. Primary prevention
c. Secondary prevention
d. Tertiary prevention

34. Ans. (a) Primary level prevention

Ref: Park's Textbook of Preventive and Social Medicine 25th ed. pg. 870

- Tobacco control law is a primary level prevention measure.
- Primary prevention focuses on preventing the onset of a disease or condition and aims to promote health and prevent the occurrence of risk factors.
- Tobacco control laws, such as ban on smoking in public places and restrictions on tobacco advertising, are implemented to reduce the prevalence and initiation of smoking, thereby preventing tobacco-related diseases and promoting public health.

Extra Mile
- **Primordial level prevention:** Primordial prevention refers to preventing the emergence of risk factors in a population or community.
- **Secondary level prevention:** Secondary prevention aims to detect and treat diseases in their early stages to prevent further progression.
- **Tertiary level prevention:** Tertiary prevention focuses on reducing the impact of a disease or condition and preventing disability or complications.

35. Ans. (a) Primary level prevention

Ref: Park's Textbook of Preventive and Social Medicine 25th ed. pg. 870

- Handwashing during Covid-19 is a primary level prevention measure.

Detailed discussion given above

36. Ans. (c) Demonstration

Ref: Park's Textbook of Preventive and Social Medicine 25th ed. pg. 901

- Giving a class in a village for wound dressing after a dog bite involves demonstrating the proper technique of wound dressing to the community members.
- Demonstration is a form of communication that involves showing how to perform a task or skill.
- In this context, demonstrating wound dressing techniques allows the community members to visually learn and understand the correct procedure.

Extra Mile
- **Lecture:** A lecture typically involves oral presentation and information sharing without practical demonstrations.
- **Flashcard:** Flashcards are visual aids that present information or prompts for learning.
- **Group discussion:** Group discussion involves interactive communication among participants.

Question 17

Penicillin inj for treatment of Rheumatic Heart Disease is which level of

(FMGE JULY 2024)

a. Primordial prevention
b. Primary prevention
c. Secondary prevention
d. Tertiary prevention

75. Ans. (c) Secondary

Ref: K. Park, 25th ed. pg. 46, 384-86

- All screening and diagnostic tests are secondary level of prevention
- Secondary prevention is a method to detect and address an existing disease prior to the appearance of symptoms.
- Examples: Screening of hypertension and cancer screenings
- **Note:** Treatment measures are also secondary level of prevention

76. Ans. (a) Specific protection

Ref: K. Park, 25th ed. pg. 110

- Specific protection targets a type or group of diseases and complements the goals of health promotion
- Health-promotional activities do not target a specific disease or condition but rather promote health and well-being on a very general level.

77. Ans. (b) Restriction of movement of healthy contact of an infectious disease

Ref: K. Park 25th ed. pg. 132

- **Quarantine** is defined as: *"The limitation of freedom of movement of such well persons who are exposed to communicable disease for a period of time no longer than the longest usual incubation period of the disease, in such manner as to prevent effective contact with those not so exposed."*
- **Isolation** on the other hand is separation of infected person from others for the period of communicability.

78. Ans. (a) Prospective cohort

Ref: K. Park 23rd ed. pg. 80

- The Framingham heart study was initiated in 1948 by US public health service to study the relationship between number of risk factors (like BP, smoking, serum cholesterol, obesity) and subsequent development of cardiovascular disease.
- Study was done in town of Framingham for 20 years in view of the slow development of heart disease.
- It is an example of prospective cohort study.

79. Ans. (a) Cohort study

Ref: K. Park 23rd ed. pg. 65

- Incidence and relative risk is accurately calculated by cohort study.
- It is a type of analytical or observational study used for hypothesis testing, also called TROHOC study prospective study/forward looking study/*cause to effect study*/exposure to outcome study/*risk factor to disease study* incidence study follow-up study.
- Prevalence is determined by cross sectional studies.

80. Ans. (c) Berkesonian bias

Ref: K. Park, 23rd ed. pg. 73-74

- Berkesonian bias is a type of study bias that arises because of the different rates of admission to hospitals for people with different diseases.
- It is termed after Dr. Joseph Berkeson who recognized this problem.

81. Ans. (b) Secondary prevention

Ref: K. Park, 23rd ed.

- Fetal cardiac monitoring is a screening test to detect any fetal distress in utero.
- *All screening and diagnostic tests are secondary level of prevention.*

TABLE: Levels of prevention

Level of prevention	Timing	Mode of prevention	Example
Primordial	Before emergence of risk factor	–	• Preventing obesity • Practising healthy lifestyle
Primary	Risk factor present but no disease yet	*By health promotion and specific protection*	• ***All vaccines*** • Contraceptives • Mosquito nets/ repellants/DDT • Chemoprophylaxis
Secondary	When disease has probably started	*By early diagnosis and treatment*	• All screening and diagnostic tests • Treatment measures • *BP monitoring*
Tertiary	Disease in progression	*By disability limitation and reha-bilitation.*	• Physiotherapy • Crutches in polio

Pregnant females	Which mosquitoes bite?	Pregnant females
Night	When do they bite?	Day
With abdomen sticking upwards	Resting position	Lies parallel to resting surface
Predominantly rural	Location	Predominantly urban
Bodies of water	Breeding ground	Shallow water surfaces

196. Ans. (a) 3 days

Ref: K. Park 25th ed. pg. 162

- Apart from vaccine, measles can be prevented by administration of immunoglobulin early in the incubation period.
- **Dose:** 0.25 mL/kg
- It should be given within 3–4 days of exposure
- These persons who are passively immunized should be given live measles vaccine 8–12 weeks later

197. Ans. (b) 7–14 days

Ref: K. Park 25th ed. pg. 253

- Infection of cholera is dose dependent. Infection occurs when the number of vibrio ingested exceeds the dose that is infective for individual.
- To produce clinical disease 10^{11} organisms required.
- **Note:** An infected person can excrete 10-20 L of fluid, which contain 10^{7}–10^{9} vibrios per mL.
- A case of cholera is infectious for a period of 10–14 days
- Convalescent carriers are infectious for 2–3 weeks.
- A chronic carrier state may last from a month up to 10 years or more.

198. Ans. (b) 100–120 mcg/day

Ref: K. Park 25th ed. pg. 681, PubMed

Requirement of iodine in child age group:

- **7–12 month:** 110 mcg/day
- **1–8 years:** 90 mcg/day
- **9–13 years:** 120 mcg/day
- **Adult/14–18 years:** 150 mcg/day
- **Pregnancy:** 250 mcg/day

199. Ans. (c) Reduces duration of diarrhea

Ref: K. Park 25th ed. pg. 489

- For the control of diarrhea, India is the first country to introduce low osmolarity ORS.
- As an adjunct to ORS, zinc is also added.
- Addition of zinc results in reduction of the number and severity of episodes and duration of diarrhea.

200. Ans. (b) Q fever

Ref: K. Park 25th ed. pg. 328

- **Q fever** differs from other rickettsial infection. There is malaise, headache. NO rash or local lesion. The infection can cause: Pneumonia, hepatitis, encephalitis.
- **DOC:** Doxycycline

Question 18

Which of the following is the vector responsible for transmitting Orentia

(FMGE JULY 2024)

a. Mite
b. Tick
c. Louse
d. Flea

Extra Mile

Rickettsial diseases, their Agents and insect vectors

Disease	Rickettsial agent	Insect vectors
Epidemic typhus	*R. prowazekii*	Louse
Endemic typhus	*R. typhi*	Flea
Scrub typhus	*R. tsutsugamushi*	Mite
Indian tick typus	*R. conorii*	Tick
Rocky mountain spotted fever	*R. rickettsii*	Tick
Rickettsial pox	*R. akari*	Mite
Q fever	*C. burnetii*	
Trench fever	*Rochalimaea quintana*	Louse

201. Ans. (d) Classify the type of leprosy

Ref: K. Park 25th ed. pg. 347-48

- Lepromin test is performed by injecting 0.1 ml of lepromin in inner aspect of forearm
- Routinely, reaction is read at 48 hours and 21 days. Two types of reactions:
  - **Early reaction:** Aka **Fernandez reaction.** Reaction is evidenced by redness and induration at the site of

- Recent studies have shown that smoking increases the risk of lung cancer by 8.6% as compared to non smokers.
- **The risk is strongly related to:**
  - Number of cigarette smoked
  - Age of starting to smoke
  - Mode of smoking
  - Nicotine and tar content
  - Length of cigarette
- One study in India has proved that there is no difference between the tar and nicotine delivery of the filter and non-filter cigarettes smoked in India. Therefore a **filter gives NO protection to Indian smokers.** The "king-size" filter cigarettes deliver more tar and nicotine than ordinary cigarette.

NATIONAL HEALTH PROGRAMS & POLICIES

237. Ans. (a) ANM

Ref: Park Textbook of Preventive and Social Medicine, 25th ed. pg. 564

- ANMs works at health sub-centers. The sub-center is a small village-level institution that provides primary health care to the community.
- The sub-center works under the Primary Health Centre (PHC).
- Health workers like ASHA, AWW, Trained Dais Work at Village Level.

238. Ans. (b) NISCHAY

Ref: K. Park 25th ed. pg. 575

- The simple way to confirming the first trimester is to conduct a urine examination using a pregnancy test kit.
- The kit detects pregnancy on the basis on the basis of presence of human chorionic gonadotropin hormone in the urine.
- The government of India has made **"Nischay"** pregnancy test kit available across the country. This kit is distributed by ASHA.

239. Ans. (c) Indirect pattern medical benefit

Ref: K. Park 25th ed. pg. ??

- ESI Act is passed in 1948. It is an important measure of social security and health insurance in India.
- It provides certain cash and medical benefits to industrial employees in case of illness, maternity and employment injury.
- Medical benefit is provided either directly through the agency of ESI hospitals and dispensaries, or indirectly

Question 19

WHO definition of blindness is

(FMGE JULY 2024)

a. 6/60
b. 3/60
c. 6/18
d. 1/60

240. Ans. (c) <3/60 in better eye

Ref: Park, 25th ed. pg. 430

Distance Vision Impairment

- Mild - Presenting visual acuity worse than 6/12
- Moderate: Presenting visual acuity worse than 6/18
- Severe: Presenting visual acuity worse than 6/60
- Blindness: Presenting visual acuity worse than 3/60

241. Ans. (b) Once every 3 months

Ref: Park, 25th ed. pg. 833

- Adult mosquitoes are most commonly controlled by spraying houses with residual insecticides. DDT is the insecticide of choice and dosages of 1–2 grams of pure DDT per sq. metre are applied 1–3 times a year to walls and other surfaces where mosquitoes rest.
- In areas where DDT resistance is encountered, malathion and propoxur and to a lesser extent gamma-HCH (lindane) are recommended.

Toxicants suitable against malaria vectors as residual spray applications

Toxicant	Dosage in g/m²	Average duration of effectiveness (months)
DDT	1 to 2	6 to 12
Lindane	0.5	3
Malathion	2	3
OMS–33	2	3

242. Ans. (c) 24 hours

Ref: WHO.int, Park, 25th ed. pg. 803

- Notifiable disease must be reported to WHO within 24 hours of diagnosis

243. Ans. (c) Cotton swab in Yellow bag

Ref: K. Park, 25th ed. pg. 828

- Soiled waste like items contaminated with blood, and fluids, including cotton, dressings, soiled plaster casts, linen, beddings are all disposed in a yellow plastic bag and the treatment includes incineration or deep burial
- Syringe with needle is discarded in white/translucent puncture proof container
- Glassware including medicine vials is discarded in blue box

244. Ans. (a) 1000

Ref: K. Park, 25th ed. pg. 934

265. Ans. (a) Kala-azar

Ref: K. Park, 21st ed. pg. 113

- Indian Academy of Pediatrics (IAP) approved following vaccines (Kala Azar is NOT included in schedule)
- **Following vaccines are approved by IAP:** Polio, hepatitis, BCG, DPT, Hib, MMR, TT, typhoid.

266. Ans. (b) Yellow fever

Ref: K. Park, 21st ed. pg. 380

- The National Vector Borne Disease Control Programme (NVBDCP) is implemented for the prevention and control of vector borne diseases such as: Malaria, Filariasis, kala-azar, Japanese encephalitis, Dengue and Chikunguniya.
- Yellow fever is NOT a part of NVBDCP.

PREVENTIVE OBSTETRICS, PEDIATRICS AND GERIATRICS

267. Ans. (b) Antenatal to 6 weeks after delivery

Ref: Park Textbook of Preventive and Social Medicine, 25th ed. pg. 610

- A maternal death is defined as a death while pregnant or within 42 days of the end of pregnancy, from any cause related to or aggravated by the pregnancy.

268. Ans. (c) Vitamin A deficiency

Ref: K. Park 25th ed. pg. 431

- The most common causes of blindness in developed countries are accidents, glaucoma, diabetes, vascular diseases like hypertension, cataract.
- In India, the most common cause of blindness being responsible for 50–80% of all blindness.
- Vitamin A deficiency is responsible for most childhood blindness in India.

269. Ans. (b) 8

Ref: K. Park 25th ed. pg. 575.

WHO ANC model recommends 8 antenatal visits.

- 1 in 1st trimester up to 12 weeks
- 2 in 2nd trimester at 20 weeks and 26 weeks
- 3 in 3rd trimester at 30, 34, 36, 38, 40 weeks.

270. Ans. (d) 4 mg

Ref: Institute of Medicine (US). Dietary Reference Intakes for Thiamine, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. Washington (DC): National Academies Press (US); 1998

- All women who can become pregnant should get 400 mcg of frolic acid each day, in addition to consuming food with folate for a varied diet, to lower the chance of having a baby with neural tube defect.

271. Ans. (d) Hemorrhagic disease of newborn

Ref: K. Park 25th ed. pg. 675

- Newborn infants tend to be deficient in vitamin K due to minimal stores of prothrombin at birth and lack of an established intestinal flora.
- Soon after birth, all infants or those at increased risk should receive a single IM dose of a vitamin K preparation

Question 20

Ideal antenatal visit

(FMGE JULY 2024)

a. 4-7
b. 8-10
c. 12-14
d. 5-7

273. Ans. (b) 4

Ref: Park, 25th ed. pg. 575

Antenatal care (ANC) is defined as, care given to pregnant female by skilled health care professional, in order to ensure health and safety of both pregnant mother and baby.

- Components of ANC:
  - Risk identification
  - Prevention and management of pregnancy related diseases
  - Health education and health promotion
- Ideally ANC begin soon after conception and continue throughout the pregnancy.
- Antenatal visits (total ~ 13):
  - Once a month during first 7 months
  - Twice a month in 8th month
  - Once a week thereafter
- Minimum 4 antenatal visits recommended:
  - 1st visit: Within 12 weeks, preferable as soon as pregnancy is suspected (for pregnancy registration and first ANC check up)
  - 2nd visit: Between 14 and 26 weeks
  - 3rd visit: Between 28 and 34 weeks
  - 4th visit: Between 36 weeks and term

Extra Mile

- Registration of pregnancy is the responsibility of ANM, that should be done within 12 weeks.

Question 21

What advice should be given to a mother of a newborn regarding exclusive breastreeding for.

(FMGE JULY 2024)

a. 6 months
b. 4 months
c. 3 months
d. 2 months

274. Ans. (a) 6 months

Ref: K. Park, 25th ed. pg. 542, 565

- Exclusive breast feeding is recommended till 6 months.

275. Ans. (b) Hemoglobin

Ref: K. Park 25th ed. pg. 961

- At sub-centre laboratory examinations that are given are:
  - Urine test for pregnancy confirmation
  - Hemoglobin estimation
  - Urine and albumin and sugar

276. Ans. (b) 25

Ref: K. Park 25th ed. pg. 557

MTP Act 1971

- **Conditions for MTP:**
  - **Medical:** Where continuation of pregnancy might endanger mother's life
  - **Eugenic:** There is high risk of child being born with serious physical or mental abnormalities
  - **Humanitarian:** Where pregnancy is outcome of rape
  - **Socio-economic:** Social or economic environment that could lead to risk of injury to the health of mother
  - **Failure of contraceptive devices:** Where pregnancy is as a result of contraceptive method failure
- In case the woman is under 18 years or a lunatic of any age—a written consent of guardian is necessary
- **Who can perform?**
  - **If pregnancy below 12 weeks:** A registered medical practitioner having experience in OBG
  - **If >12 weeks – 20 weeks:** Opinion of two registered medical practitioner is necessary
- **Where to be performed:** Established hospitals or a place approved by government or any non-government institution after obtaining license from chief medical officer of district.

MTP Rules 1975

- **Approval of boards:** According to new rules the chief medical officer of district is empowered to certify if the doctor has necessary training in gynaecology and obstetrics to do abortions. Application to certification boards is NOT required.
- **Qualification required:**
  - If assisted an RMP of an approved institution in performance of **25 cases** of MTP or
  - 6 months of house manship in OBG or
  - MD in OBG or
  - 3 years of practice in OBG for those doctors registered before 1971 MTP Act
  - 1 year of practice in OBG for those doctors registered after 1971 MTP Act

277. Ans. (a) 350 kcal

Ref: K. Park 25th ed. pg. 690-91

- The energy requirement of women is increased over and above their normal requirement in following conditions:
  - **Pregnancy:** + 350 kcal/day throughout pregnancy
  - **Lactation:** + 600 kcal/day during first 6 months and +520 kcal/day during next 6 months.

Extra Mile

TABLE: Energy requirement of indians at different ages

Age group	Remarks	(kcal/day)
Man	Sedentary work Moderate work Heavy work	2,320 2,730 3,490
Woman	Sedentary work Moderate work Heavy work Pregnant woman Lactation	1,900 2,230 2,850 +350 +600 +520
Infants	0-6 months 6-12 months	500 670
Children	1-3 years 4-6 years 7-9 years	1,060 1,350 1,690

278. Ans. (b) Intrauterine growth retardation

Ref: K. Park 25th ed. pg. 587

Low birth weight

- Defined as birth weight of less than **2.5 kg,** regardless of gestational age
- The birth weight of an infant is the single most important determinant of its chances of survival, healthy growth and development.
- Two main groups of low birth weight:
  - **Premature born (short gestation):** MC in developed countries where population of low birth weight is less
  - **Fetal growth retardation:** MC in countries (like India) where proportion is high. It is considered as the most common cause of low birth weight in India.

Extra Mile

- Apart from birth weight, babies can be classified in 3 groups according to gestational age:
  - **Preterm:** Born before 37 weeks of gestation (<259 days)
  - **Term:** Born between 37–42 weeks (259–293 days)
  - **Post-term:** Born at 42 completed week or any time after (≥294 days)

Contd...

312. Ans. (a) 65

Ref: K. Park, 23rd ed. pg. 630

TABLE: Nutritive value of milks compared (value per 100 g)

	Buffalo	Cow	Goat	Human
Fat (g)	6.5	4.1	4.5	3.4
Protein (g)	4.3	3.2	3.3	1.1
Lactose (g)	5.1	4.4	4.6	7.4
Calcium (mg)	210	120	170	28
Iron (mg)	0.2	0.2	0.3	
Vitamin C (mg)	1	2	1	3
Minerals (g)	0.8	0.8	0.8	0.1
Water (g)	81.0	87	86.8	88
Energy (kcal)	117	67	72	65

313. Ans. (a) 1.2 mcg

Ref: K. Park, 23rd ed. pg. 620

Vitamin B_{12}

- Vitamin B_{12} is complex organo-metallic compound with a cobalt atom. The preparation which is therapeutically used is cyanocobalamin, which is relatively cheap.

Source: Good sources are liver, kidney, meat, fish, eggs, milk and cheese. Vitamin B_{12} is not found in foods of vegetable origin. It is also synthesized by bacteria in colon.

Deficiency: Vitamin B_{12} deficiency is associated with

Question 22

A woman develops edema, visual disturbances, and heart failure alter consuming a food item. What is the most likely adulterant?

(FMGE JULY 2024)

a. Sanguinarine
b. BOAA
c. Pyrrolizidine
d. Aflatoxin

314. Ans. (b) Sanguinarine

Ref: K. Park, 23st ed. pg. 658

- **Epidemic dropsy** is caused by contamination of mustard oil with Argemone oil *(seeds of argemone Mexicana seeds closely resemble that of mustard oil)*
- Toxin which is contained in argemone oil is ***Sanguinarine***
- This sanguinarine interferes with oxidation of Pyruvic acid, which leads to accumulation of pyruvic acid in blood.
- This may cause non-inflammatory edema of lower limbs, diarrhea, dyspnea and even cardiac failure and death.

315. Ans. (d) 650 kcal

Ref: DC Dutta, 8th ed. pg. 174

Dutta states: A healthy mother will produce **about 500–800 mL of milk a day** to feed her infant. This requires about **700 kcal/day** for the mother, which must be made up from diet or from her body store. For this purpose a store of about 5 kg of fat during pregnancy is essential to make up any nutritional deficit during lactation.

Extra Mile

- Iron need during lactation is 1 mg/day.
- Daily requirement of calcium during pregnancy and lactation averages 1–1.5 g.

316. Ans (d) She weighs 60 kg

Ref: Park, 19th pg. 501-2

- 60 kg weight is of Indian reference man and not woman

TABLE: Summary of Indian reference man and woman

An Indian reference man	An Indian reference woman
• Between **18 and 29 years** of age	• Between **18 and 29 years of age**
• **Weighs 60 kg** • **Height = 1.73**	• **Healthy** and **weighs 55 kg.** • **Height = 1.61**
• Free from disease and physically fit for active work.	• Engaged for **8 hours** in general household work, in light industry or in other moderately active work.
• Employed for 8 hours in	• Spends 4–6 hours sitting or

Question 23

Vitamin A deficiency is seen in ?

(FMGE JULY 2024)

a. Pinguecula
b. Bitot Spots
c. Pterygium
d. Stocker's Line

317. Ans. (b) Bitot's spot

Ref: K. Park, 23rd ed. pg. 615, 641

- **Xeropthalmia:** All the ocular manifestation of Vitamin A deficiency.
- First clinical sign of Vitamin A deficiency: *Conjunctival Xerosis*
- First clinical symptom of vitamin A deficiency: *Night blindness*

WHO Classification of Xeropthalmia

at which half of the changes in the population during the year have occurred.

- It is used to calculate, crude birth rate and crude death rate.
- Example: Crude birth rate

$$= \frac{\text{Total number of births} \times 1000}{\text{Total mid year population (as on 1st July)}}$$

379. Ans. (c) Goal

Ref: Park, 25th ed. pg. 931

- GOAL is defined as the ultimate desired state towards which objectives and resources are directed. Unlike objectives and targets, goals are not constrained by time or existing resources, nor are they necessarily attainable.

380. Ans. (b) Group

Ref: Park, 25th ed. pg. ??

- The Delphi method is a structured communication technique. It is a process used to arrive at a group opinion or decision by surveying a panel of experts. Experts respond to several rounds of questionnaires, and the responses are aggregated and shared with the group after each round.
- Delphi method is highly used in collective intelligence.

381. Ans. (b) United Nations

Ref: K. Park, 25th ed. pg. 963

- The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.
- The 17 SDGs are integrated—that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

382. Ans. (c) 21 days

Ref: K. Park 25th ed. pg. 903

- According to Central Birth and Death Registration Act 1969:
  - The time limit for registration of vital events like births and death is 21 days
  - Late fee is imposed in case of default
  - From October 2018, Aadhar number is must for registration of death
- **Lay reporting of health information:** Collection of information (birth and death), its use and its transmission

Question 24

In a community for malaria out of those vaccinated 6 had disease and out of those non vaccinated 12 had disease. Calculate the relative risk?

(FMGE JULY 2024)

a.
b.
c.
d.

383. Ans. (d) $\text{PAR} = \frac{\text{Incidence among total population} - \text{incidence among non-exposed}}{\text{Incidence among total population}} \times 100$

Ref: K. Park 25th ed. pg. 86

- **Population – attributable risk is** incidence of disease (or death) in total population minus the incidence of disease (or death) among those who were NOT exposed to the suspected causal factor divided by incidence among total population.
- **Use:** It provides an estimate of the amount by which the disease could be reduced in that population if the suspected factor is eliminated or modified.

Extra Mile

$$\text{Relative risk} = \frac{\text{Incidence among exposed}}{\text{Incidence among non-exposed}}$$

$$\text{Attributable risk} = \frac{\text{Incidence among exposed} - \text{incidence among non exposed}}{\text{Incidence among exposed}} \times 100$$

384. Ans. (b) Net reproduction rate

Ref: K. Park 25th ed. pg. 539–540

- **Net Reproduction Rate (NRR):** No. of daughters a new-born girl will bear during her life time ***assuming fixed age specific fertility and mortality rates***.
  - It is a demographic indicator
  - NRR of 1 is equivalent to attaining approximately the 2-child norm.
  - If NRR <1, the reproductive performance of the population is said to be below replacement level.
- **Total Fertility Rate:** it is the average number of children a woman would have if she were to pass through her reproductive years bearing children at the same rates as the women now in each age group.
- **Gross Reproduction Rate:** Average number of girls that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15–44 or 49 years), assuming no mortality.
- **General Fertility Rate:** It is the number of live birth per 1000 women in reproductive age group (15–44 or 49 years) in a given year

- GFR =

$$\frac{\text{No. of live births in an area during a year}}{\text{Mid year female population of age 15–44 (or 49) years}} \times 1000$$

385. Ans. (c) 4

Ref: K. Park, 23rd ed. pg. 479

Demographic Cycle

The history of world population since 1650 suggests that there is a demographic cycle of 5 stages through which a nation passes:

- **First stage (High stationary):** This stage is characterized by a **high birth rate and a high death rate** which cancel each other and the population remains stationary.
- **Second stage (Early expanding):** The **death rate begins to decline, while the birth rate remains unchanged**. Many countries in South Asia, and Africa are in this phase. Birth rates have increased in some of these countries possibly as a result of improved health conditions, and shortening periods of breastfeeding.
- **Third stage (Late expanding):** The death rate declines still further, and the birth rate tends to fall. The population continues to grow because births exceed

Question 25

What percentage of data falls within one standard deviation of the mean in a

(FMGE JULY 2024)

a. 68%
b. 95%
c. 98%
d. 99%

Question 26

Mr J age 68, Mrs J age 59, their son age 30 and his wife age 27 and a grandson of 5 years old. What is the no of dependents in the family?

(FMGE JULY 2024)

a.
b.
c.
d.

387. Ans. (b) Population <15 years and >65 years

Ref: K. Park 23rd ed. pg. 484

- Dependency ratio is the proportion of persons above 65 years of age and children below 15 years of age who are considered to be dependent on economically productive age group (15-64).

$$\textit{Dependency Ratio} = \frac{\text{Persons} < 15 \text{ years} + > 65 \text{ years}}{\text{Persons between 15 and 65 years}}$$

- Dependency ratio of India is 62 per 100 or 0.62. This means 62 non-earning peoples in India are dependent on 100 earning population.

388. Ans. (a) Broad at base and narrow at apex

Ref: K. Park 23rd ed. pg. 482

389. Ans. (b) It is distributed equally in study and control groups

Ref: K. Park 23rd ed. pg. 72

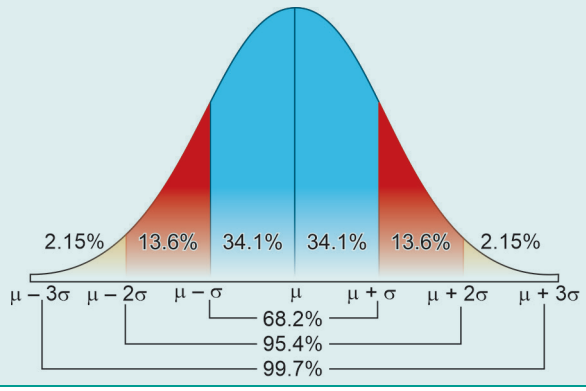
390. Ans (c) 95.4%

Ref: K. Park 23rd ed. pg. 849

- The standard normal curve is a smooth, bell shaped, perfectly symmetrical curve, based on infinitely large number of observations.
- The area between 2 standard deviations on either side of the mean will cover most of the values i.e. ~95%.

The normal distribution or 'normal curve' is an important concept in statistical theory. In a normal curve:

- The area between one standard deviation on either side of the mean will include approximately 68% of values in the distribution.
- The area between two standard deviations will cover approx 95% of the values.
- The area between two standard deviations will cover approx 99.7% of the values



454. Ans. (b) Aflatoxin

Ref: Park, 25th ed. pg. 713

- Aflatoxin, a food contaminant produced by the fungi *Aspergillus flavus* and *Aspergillus parasiticus*, is a known human carcinogen and hepatotoxic that has been shown to be a causative agent in the pathogenesis of hepatocellular carcinoma

455. Ans. (d) TB screening should be done at regular intervals

Ref: Park, 25th ed. pg. 221

People who are at increased risk of TB because of biological and behavioral factors that compromise

Question 27

Which pneumoconiosis is caused by exposure to cotton dust?

(FMGE JULY 2024)

a. Byssinosis
b. Bagassosis
c. Anthracosis
d. Sillicosis

456. Ans. (c) Coal dust

Ref: K. Park, 25th ed. pg. 843

List of Pneumoconiosis

- Silicosis – silicon dust
- Anthracosis – Coal dust
- Asbestosis – Asbestosis dust
- Byssinosis – Cotton fibre
- Bagassosis – Molasses (sugarcane)
- Farmers lung – Mould hay

457. Ans. (a) CO_2, ozone, methane

Ref: Inventory of US greenhouse gas emissions and sinks, 1990-1994 By United States Environmental Protection Agency

- A **greenhouse gas** is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect.
- **The primary greenhouse gases in Earth's atmosphere** are **water vapor, carbon dioxide, methane, nitrous oxide,** and **ozone (O_3).**
- Chlorofluorocarbons (CFCs), Hydrofluorocarbons (HFCs) and other compounds such as perfluorinated carbons are also green house gases.
- Without greenhouse gases, the average temperature of Earth's surface would be about −18°C (0°F), rather than present average of 15°C (59°F).

458. Ans. (b) 5 Rad per person per year

Ref: K. Park, 23rd ed. pg. 804

- Maximum permissible radiation exposure for general population: 5 Rad (0.5 Rem) per person per year.
- Maximum permissible radiation exposure for workers: 50 Rad (5 Rem) per person per year.
- Greatest source of radiation outside house: Extra-terrsetrial cosmic rays.
- Greatest source of radiation inside house: TV
- Greatest man-made source of radiation: X-ray

Extra Mile

- *Permissible sound level in hospital wards: 20–35 decibel.*
- *Maximum tolerable sound level: <85 decibel*
- *Permanent hearing loss at: >100 decibel*
- *Tympanic membrane ruptures at: 150–160 decibel.*

459. Ans (a) 20–35

Ref: K. Park, 23rd ed. pg. 741-42, 19th pg. 599

Acceptable noise levels (dBA)		
Residential:	Bed room Living room	25 40
Commercial:	Office Conference Restaurants	35–45 40–45 40–60
Industrial:	Workshop Laboratory	40–60 40–50
Educational:	Class room Library	30–40 35–40
Hospitals:	**Wards**	**20–35**

460. Ans. (a) Lung cancer

Ref: K. Park, 23rd ed. pg. 807

- Asbestosis occurs due to long duration (>10 years) exposure to asbestos.
- This may lead to pulmonary fibrosis, carcinoma of bronchus, mesothelioma of pleura/peritoneum and GIT cancer.

Other Important Occupational Cancer

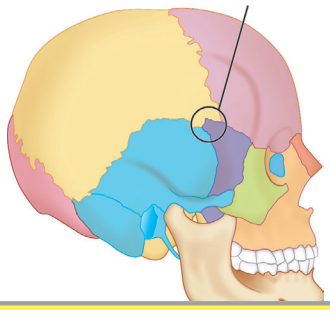
Agent	Associated cancer
Asbestosis	Mesothelioma
Arsenic	Skin, lung, liver CA
Benzene	Leukemia
Benzidine	Bladder CA
Silica	Lung CA
Wood dust	Nasal sinus

- **Option b:** DNA fingerprinting is a laboratory technique used to determine the probable identity of a person based on the nucleotide sequences of certain regions of human DNA that are unique to individuals.
- **Option d:** Cheiloscopy deals with the identification of humans based on lip traces. The lip print of every person is unique.

8. Ans. (a) Pterion

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 452

- The pterion is the region where the frontal, parietal, temporal, and sphenoid bones join. It is located on the side of the skull, just behind the temple.



Question 28

Person died in police custody during investigation. Inquest done by?

(FMGE JULY 2024)

a. Judicial Magistrate
b. Coroner
c. Higher Police official
d. Medical Examiner

9. Ans. (b) Executive Magistrate

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 2

- In India, an inquest in the case of death in police custody is usually conducted by an Executive Magistrate.
- The Executive Magistrate is a judicial officer who has the authority to conduct inquiries, issue warrants, and perform other judicial functions.
- The role of the Executive Magistrate in this context is to investigate the circumstances surrounding the death and determine whether any foul play or negligence was involved.

10. Ans. (a) Oral evidence

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 11

- When a court orders a witness to come and record their evidence in court, it typically refers to the witness providing their testimony orally. Oral evidence is the spoken testimony given by a witness under oath in a

Question 30

Identify the finding is antemortem Drowning?

(FMGE JULY 2024)

a. Cadaveric Spasm
b. Pugilistic attitude
c. Washer woman hand
d. Emphysema aquosum

11. Ans. (b) Cadaveric spasm

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 171

- Cadaveric spasm, also known as instantaneous rigor, is a phenomenon where a person's muscles undergo sudden and involuntary contraction just before or at the moment of death. It occurs when the body is in extreme stress or undergoing intense physical exertion right before death.
- In the given scenario, the person's efforts to save themselves triggered the contraction of one group of muscles. The absence of primary relaxation refers to the fact that the muscles did not relax immediately after the contraction, which is a characteristic feature of cadaveric spasm.

Extra Mile

- Rigor mortis is the stiffening of the body's muscles that occurs several hours after death due to chemical changes in the muscle tissues.
- Algor mortis refers to the cooling of the body after death.
- Livor mortis refers to the pooling and settling of blood in the dependent parts of the body, causing discoloration.

Question 29

A person who at the time of commission of the offence was of unsound mind, is exempt? if they didn't know the nature of theact or its consequences. This rule known as?

(FMGE JULY 2024)

a. McNaughton rule
b. Durhams rule
c. Curren s rule
d. Irresistible Impulse test

12. Ans. (a) McNaughten's rule

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg.110

- The statement provided is in line with the principles established by the McNaughten's rule, which is a legal test for determining insanity in criminal cases. The McNaughten's rule, named after the case of Daniel McNaughten in 1843, sets forth the following criteria for establishing the defense of insanity:
  1. The accused must have been suffering from a mental disorder at the time of the offense.
  2. Due to the mental disorder, the accused must not have understood the nature and consequences of their actions.

3. The accused must not have known that what they were doing was wrong in a legal or moral sense.

- According to the McNaughten's rule, if accused persons meet these criteria, they are considered legally insane and cannot be held criminally responsible for their actions.

13. Ans. (a) Thanatology

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 146

- Thanatology is a multidisciplinary field that encompasses the scientific, psychological, social, and cultural aspects of death and dying.
- It involves the examination and exploration of various topics related to death, including the processes of dying, grief and bereavement, cultural practices and rituals surrounding death, the psychological impact of death on individuals and society, and the ethical considerations associated with end-of-life care.

Extra Mile

- Thanatopraxis/Embalming is the technique used to preserve and expose mortal remains with utmost care.
- Disinterment is the act of digging corpse out of the ground.

14. Ans. (c) Carbon monoxide

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 547

- Cherry red postmortem hypostasis is commonly associated with carbon monoxide (CO) poisoning.
- In cases of CO poisoning, a distinct cherry red coloration can be observed. CO is a toxic gas that binds strongly to hemoglobin. This binding creates a bright red or cherry red appearance in the affected tissues, including the skin. A phenomenon quite similar to livor mortis.
- The cherry red coloration in CO poisoning is most notable in areas with a high concentration of blood vessels, such as the lips, cheeks, and nail beds.

15. Ans. (a) Barberio's test

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 68

- **Barberio's test:** It is used for detection of spermine in the sample. Few drops of Barberio's reagent is added to the sample. It produces needle-shaped, yellow color crystals of sperm.
- **Teichmann's test:** It is used to detect the presence of hemoglobin in a stain or sample. It involves adding a small amount of the stain or sample to a microscope slide, mixing it with a reagent (e.g., hydrogen peroxide), and observing the formation of characteristic rhomboid-

Question 31

A patient was admitted with complaints of tachycardia, arrythmias. On examination multiple scratch marks over the body. Probable drug of abuse in above patient?

(FMGE JULY 2024)

a. Cocaine
b. Morphine
c. Datura
d. Cannabis

16. Ans. (d) Cocaine bugs

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 624

- During the stage of excitement in acute cocaine poisoning, several signs and symptoms may manifest. These include:
  a. **Feeling of well-being:** Cocaine can induce a sense of euphoria, leading to an intense feeling of happiness or well-being
  b. **Tingling or numbness in hands and feet** due to peripheral vasoconstriction
  c. **Pupils dilated and rapid pulse and sweating**
- "Cocaine bug" is not a recognized sign or symptom of acute cocaine poisoning. It may refer to a hallucination or delusional parasitosis, where individuals experiencing cocaine intoxication may have a sensation of insects crawling on or under their skin. This perception is known as formication and is seen mainly in the chronic addicts.

17. Ans. (a) Burking

Ref: VV Pillay. Textbook of Forensic Medicine and Toxicology, 18th ed. pg. 345

- Homicidal smothering and traumatic asphyxia are causes of death associated with a criminal method known as "Burking."
- The method of Burking involves forcibly smothering or compressing the chest and abdomen of a victim, thereby obstructing their airway and preventing normal breathing. The weight or pressure applied to the victim's body restricts their ability to inhale, leading to asphyxia and subsequent death.

the person is dropped through the trap door, it leads to sudden jerk of head and the maximum force will be at the point opposite to the position of knot.

- This causes fracture-dislocation usually at the level of the second and third, or third and fourth cervical vertebrae, resulting in damage of cervical cord or rupture of brain stem leading to instantaneous death.
- Asphyxia, cerebral hypoxia, cerebral venous congestion and vagal inhibition are the cause of death in hanging and ligature strangulation. The commonest being a combination of asphyxia and venous congestion.

47. Ans. (b) 17

Ref: Essentials of Forensic Medicine and Toxicology by Dr KS Narayan Reddy 34th ed. pg. 79

- According to the Juvenile Justice (Care and protection of children) Act, 2000 **"juvenile or boy"** means a person (boy or girl) who has not completed 18 years of age.
- "Juvenile in conflict with law" would mean a juvenile alleged to have committed an offence and not completed 18 years of age on the date of commission of such an offence as per Juvenile Justice care and protection of children amendment bill, 2006.

48. Ans. (a) Operate without consent

Question 32

Person died in police custody during investigation. Inquest done by?

(FMGE JULY 2024)

a. Judicial Magistrate
b. Coroner
c. Higher Police official
d. Medical Examiner

49. Ans. (b) Judicial magistrate

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 44

CONDITIONS IN WHICH INQUEST IS DONE BY MAGISTRATE

Judicial Magistrate

- Death in police custody
- Death in police firing
- Death in police interrogation

Executive Magistrate

- Death in mental asylum
- Dowry death
- Exhumation

50. Ans. (a) If victim survives after recording DD

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 49

- If the victim survives after giving dying declaration, then it will not be considered.
- But, it has corroborative value and the victim will be called to give oral evidence.

51. Ans. (b) IPC 84

Ref: Forensic Medicine and Toxicology by Rabindra Nath Karmakar, pg. 566

- The Indian counterpart of McNaughton's rule is IPC Sec 84.
- According to this rule: *"Nothing is offence which is done by a person, who at the time of doing it, is, by reason of unsoundness of mind, incapable of knowing the nature of act or that he was doing what is either wrong or contrary to law"*

52. Ans. (c) 304-A

- **IPC 304:** Culpable homicide not amounting to murder
- **IPC 304 A:** Causing death by medical negligence
- **IPC 304 B:** Dowry death

53. Ans. (c) Magistrate

- Within 7 years of marriage, Bodily injury caused by husband or relative, which lead to death comes under Dowry death and punished under IPC 304 B.
- Inquest in such condition is done by magistrate.

54. Ans. (d) Poverty

Ref: Forensic Medicine and Toxicology by RN Karmakar pg. 370

- Poverty is not a ground for divorce
- **Impotence** can be ground for divorce. A wife can sue for marriage dissolution on grounds of husband's impotency, given that the 2 facts are proved:
  - Husband was impotent at the time of marriage
  - Husband continues is to be impotent till the filing of suit

Grounds for divorce:

- Adultery
- Cruelty
- Desertion
- Impotency
- Forced conversion of religion
- Communicable venereal diseases, incurable disease like leprosy, incurable mental disorder and insanity
- Either of spouse not alive or not seen for more than 7 years
- Frigidity (an example of mental cruelty)

High Court thereon, it shall cause such order to be carried into effect by issuing a warrant or taking such other steps as may be necessary.

Section 414. Execution of sentence of death passed by High Court: When a sentence of death is passed by the High Court in appeal or in revision, the Court of Session shall, on receiving the order of the High Court, cause the sentence to be carried into effect by issuing a warrant.

Section 419. Direction of warrant for execution: Every warrant for the execution of a sentence of imprisonment shall be directed to the officer in charge of the jail or other place in which the prisoner is, or is to be, confined.

75. Ans. (b) Masturbation

Ref: The essentials of FSM by KS Narayan Reddy, 31st ed. pg. 404

- Masturbation is an offence only when practiced openly; Ex: In telephone booth, lavatories.

TOXICOLOGY

76. Ans. (b) Neurotoxic

Ref: Essentials of Forensic Medicine and Toxicology

Question 33

Chronic alcoholic came with complaints agitation, global confusion, disorientation, hallucinations, fever, hypertension, diaphoresis, and autonomic hyperactivity after cessation of alcohol since 48 hours. Diagnosis is?

(FMGE JULY 2024)

a. Delirium tremens
b. Wernicke Encephalopathy
c. Korsakoff Psychosis
d. Magnan Phenomena

77. Ans. (d) Delirium tremens

Ref: Essentials of Forensic Medicine and Toxicology by Dr KS Narayan Reddy 34th ed. pg. 539

- **Delirium Tremens** results from the long-continued action of the alcohol on the brain.
- It typically begins 72 to 96 hours after the withdrawal of alcohol.
- There is an acute attack of insanity in which the main symptoms are coarse muscular tremors of face, tongue and hands, insomnia, restlessness, loss of memory, psychomotor agitation, confusion, violent behaviour etc.
- It is considered unsoundness of mind, not intoxication, hence the person will not be liable for any acts during such episodes.

78. Ans. (c) Opium withdrawal

Ref: Essentials of Forensic Medicine and Toxicology by Dr KS Narayan Reddy 34th ed. pg. 563

- The symptoms are suggestive of Opium withdrawal. Same can be seen with excitatory phase of cocaine intoxication.
- Opioid usually causes symptoms like constipation, bradycardia, miosis etc. The withdrawal symptoms are usually opposite to the usual effect of opioid (like diarreha, tachycardia, mydriasis).
- Withdrawal symptoms occur after withdrawal of the drug for more than 12 hours and last about a week. Yawning is a common feature. Symptoms are classified into minor, moderate and major.
- **Minor:** Dilated pupils, piloerection, yawning etc.
- **Moderate:** Restlessness, insomnia, hypertension etc.
- **Major:** Vomiting, diarrhoea, hypotension etc.
- Death may be so rapid that the needle may still be found in the vein, when the body is discovered.

Extra Mile

- Cocaine withdrawal range from moderate to severe dysphoria, depression, anxiety, decreased libido, etc.
- Cannabis does not cause physiological dependence or addiction.

79. Ans. (d) Dhatura

Ref: Essentials of Forensic Medicine and Toxicology by Dr KS Narayan Reddy 34th ed. pg. 557

- The symptoms are highly suggestive of datura fastuosa poisoning. The active principle is hyoscine, hyoscyamine and traces of atropine.
- Peripheral effects are predominant and result from anticholinergic (parasympatholytic) action.
- **Signs and symptoms includes (8 D's):**
  - Dryness of mouth, dysphagia, dilated pupils, dry-hot skin, drunken gait, delirium, drowsiness, death due to respiratory failure.
- 1st stage of Cocaine intoxication is stage of excitement, symptoms mainly include restlessness, rapid pulse, dilated pupils etc. 2nd stage of depression includes (within an hour or less) symptoms such as feeble respiration, profuse perspiration, collapse, hypertension, anxiety leading to paranoia etc.

Extra Mile

- Heroin is a semisynthetic narcotic derived from opium. Heroin provides intense euphoria for several minutes followed by sedation for an hour.
- Cannabis sativa intoxication produces psychiatric and physical symptoms.

80. Ans. (a) Cocaine

Ref: Essentials of Forensic Medicine and Toxicology by Dr KS Narayan Reddy 34th ed. pg. 560

- Increased blood pressure, heart rate and respiratory rate is due to the action of cocaine on sympathetic system. Other symptoms include hyperactivity, hyperthermia and mydriasis.
- Cocaine is a powerful stimulant of CNS for a short time, followed by depression. The euphoric effect depends on the release of neurotransmitters. Its action is somewhat like that of amphetamine.

Extra Mile

- **Heroin** is a semisynthetic derivative of Morphine. Intense euphoria lasts for minutes followed by sedation for about one hour, and the effects are completely lost in 3 to 6 hours.
- **LSD** (lysergic acid diethylamide) comes under the class of psychedelics (hallucinogens). They produce an alteration in environmental awareness while the individual maintains the capacity to recognise that what he is experiencing is not real.

81. Ans. (a) Bagging

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 622

TECHNIQUES FOR INHALATION

- **Sniffing:** Inhalation of fumes from the liquid in an open container.
- **Bagging:** Placing the chemical in a bag and then putting it over the face.
- **Huffing:** Applying the chemical to a cloth/rag and then inhaling it by covering nose and mouth with the cloth/rag.
- **Glading:** Inhaling the aerosols from air freshner

82. Ans. (b) Respiratory paralysis

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 527, 528

First image shows a snake with head barely distinguishable from neck and paired transverse bands. These are features of common krait. The patient has developed envenomation from krait (Bungarus species) as evident from bilateral ptosis.

Signs and symptoms of krait bite are:

- Abdominal pain
- Ptosis
- Dysarthria
- Dysphagia
- Chest pain
- Quadriparesis
- Respiratory paralysis and death may occur

83. Ans. (b) Hydrogen sulphide

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 469

TABLE: Smell due to various poisons

S. No.	Poison	Odor
1.	Phosphorus, heavy metal poisoning (arsenic, selenium, thallium), parathion, malathion, alphos	Garlic-like
2.	Ethanol, methyl or propyl alcohol, chloroform, nitrites, acetone	Sweet and fruity
3.	Paraldehyde, choloral hydrate	Acrid
4.	H.S. mercaptans, disulfrum	Rotten eggs

Question 34

Treatment of Datura poisoning?

(FMGE JULY 2024)

a. Physostigmine
b. Atropine
c. Sodium Nitrite
d. Neostigmine

84. Ans. (c) Deferoxamine

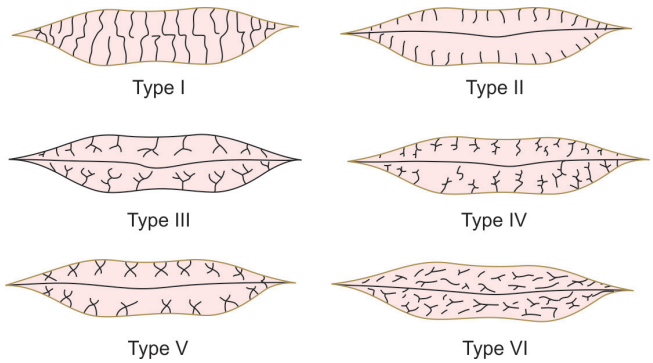
Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 476

Deferoxamine is used as antidote for:

- Acute iron poisoning
- Hemochromatosis
- Transfusional chronic iron overload

S. No.	Toxic agent	Specific antidote
1.	Acetaminophen	N-acetyl cysteine
2.	Anticholinergics (e.g. dhatura, atropine)	Physostigmine
3.	Anticholinesterases (e.g. OPCs)	Atropine and pralidoxime (2-PAM)
4.	Benzodiazepines	Flumazenil
5.	CO	Oxygen, hyperbaric oxygen
6.	Cyanide	Sodium nitrite, sodium thiosulfate
7.	Heavy metals (lead, mercury, iron) and arsenic	Specific chelating agents
8.	Methanol, ethylene glycol	Ethanol or fomepizole
9.	Opioids	Naloxone
10.	Snake venom	Specific antivenin

FMGE SOLUTIONS



FIGURES: Types of lip-prints

- Type-I (Long vertical type)—Grooves running vertically for whole length
- Type-II (Short vertical type)—Grooves running vertically for partial length
- Type-III (Branching type)—Grooves are branched.
- Type-IV (Diamond type)—Grooves are intersected
- Type-V (Reticular type)—Grooves are reticulated
- Type-VI (Non-specific type)—Irregular having no specific pattern

197. Ans. (a) Pulmonary embolism

- In death certificate, 1A is the immediate cause of death. Like in this example, diabetic patient developed DVT, which leads to pulmonary embolism. The pulmonary embolism is the immediate cause of death.
- Line 1c is known as essence of death certificate.
- Given below is an example of death certificate:

Cause of death the disease or condition thought to be the underlying cause should appear in the lowest completed line of part I		
I	(a) *Disease or condition leading **directly** to death*	Intraperitoneal hemorrhage
	(b) *Other disease or condition, if any, **leading to** I*(a)	Ruptured metastatic deposit in liver
	(c) *Other disease or condition, If any, leading to I*(b)	Primary adenocarcinoma of ascending colon
II	*Other significant conditions* **Contributing to death** *but not Related to the disease or Condition causing it*	Non–insulin dependent diabetes mellitus

The colon cancer on line I (c) led directly to the liver metastases on line I (b), which ruptured, causing the fatal hemorrhage on I (a). Adenocarcinoma of the colon is the underlying cause of death

198. Ans. (a) Hyperextension of the neck

Question 35

MTP for contraceptive failure can be done upto how many weeks?

(FMGE JULY 2024)

a. 20wks
b. 24wks
c. 32wks
d. 12wks

199. Ans. (b) 20 weeks

Medical Termination is permitted up to 20th week.

- Indications of MTP:
  - **Social:** Failure of contraceptives in a married woman (till 20 weeks).
  - **Eugenic:** Fetus with serious physical or mental abnormalities diagnosed by a medical board
  - **Therapeutic:** If continuation of pregnancy endangers mother life (can be done anytime).
  - **Humanitarian:** If pregnancy is the outcome of rape allowed upto 24 weeks.

Important Points about MTP Act 1971:

- Only a qualified registered practitioner can perform it. Chief Medical Officer of district is empowered to certify that a doctor can perform it.
- *A medical practitioner should have performed **25 cases of MTP** in a recognized hospital*
- The operation should be performed either in a Government hospital or a place recognized by government.
- Non government institutions authorized by chief medical officer can also perform MTP.
- *Consent of husband is **not** required, however written consent of the women or her guardian (if she is minor or mentally ill) is required*
- Abortion can't be performed at the husband's request, if the woman is not willing.
- **No age proof is required**
- If the woman was raped, it's not necessary to lodge a police complaint
- Professional secrecy should be maintained
- If the duration of pregnancy is upto 20 weeks, opinion of single doctor is required
- Between 20 and 24 weeks, two doctors should provide opinion that there is an indication.
- Termination can be performed by any of the doctor

MTP (Amendment) Act 2021

- MTP is permitted till 24 weeks only in case of surviors
- If failure of contraception, MTP is permitted upto 20 weeks
- If substantid fetal abnormality, MTP can be done even after 24 weeks.

Opinion

- For MTP upto 20 weeks – 1 RMP
- For 20–24 weeks – 2 RMP

- **Mugging:** Strangulation caused by holding the neck of the victim in the bend of the elbow.

- **Suffocation is** a form of asphyxia, which is caused by deprivation of oxygen, either due to lack of oxygen in environment or from obstruction of air passages at the level of nose and mouth.
- **Forms of suffocation asphyxia:**
  - **Burking** is a method of homicidal **smothering and traumatic asphyxia.**
  - **Smothering:** form of asphyxia caused by closing the external respiratory orifices either by hand or other means
  - **Gagging:** Asphyxia by forcing cloth into the mouth.
  - **Overlaying:** Asphyxia due to compression of chest.

    Ex: Mother overlied on infant.
  - **Choking:** Asphyxia by obstruction of air passages, usually between the pharynx and bifurcation of trachea. Almost always accidental.
  - **Café coronary:** Alcoholic who is grossly intoxicated dies while having meal. Death occurs due to sudden heart attack. High blood alcohol content anesthesizes the gag reflex.

209. Ans. (a) Homicidal smothering and traumatic asphyxia

Ref: The essentials of FSM by KS Narayan Reddy, 31st ed. pg. 335

Please refer to above explanation.

210. Ans. (b) Suffocation

Ref: The Essentials of FSM by KS Narayan Reddy, 31st ed. pg. 335

Please refer to above explanation.

211. Ans. (d) Eyelids

Ref: The Essentials of FSM by K.S. Narayan Reddy 31st ed. pg. 140-43, 147; Reddy's, 27th pg. 142

Order of appearance and disappearance (in sequence)

- Heart (left chamber in 1 hour)
- Eyelids (3-4 hours)
- Face muscles
- Neck and trunk
- Upper extremities
- Legs
- Small muscle of finger and toes (last to be affected, 11–12 hours)

Extra Mile

- Postmortem rigidity lasts for **18-36 hours in** summer and 24–48 hours in winter.
- Postmortem rigidity disappear in the same order as that of the appearance

212. Ans. (d) 60°C

Ref: AK Gupta's 'Essentials of Forensic medicine & Toxicology' 4/e, pg. 96

Question 36

Chronic alcoholic came with complaints agitation, global confusion, disorientation,hallucinations, fever, hypertension, diaphoresis, and autonomic hyperactivity after cessation of alcohol since 48 hours.Diagnosis is?

(FMGE JULY 2024)

a. Delirium tremens
b. Wernicke Encephalopathy
c. Korsakoff Psychosis
d. Magnan Phenomena

FORENSIC PSYCHIATRY

214. Ans. (b) Delirium tremens

Ref: Review of Forensic Medicine and Toxicology, Gautam Biswas, 3rd ed. pg. 547

- **Delirium tremens** is the most severe symptom of sudden alcohol withdrawal in chronic alcoholics.

Causes

- Sudden excess or sudden withdrawal of alcohol.
- Long continual ingestion of alcohol.
- Shock due to severe trauma, e.g. fracture in a chronic alcoholic.
- Acute infections, like pneumonia or influenza in a chronic alcoholic.

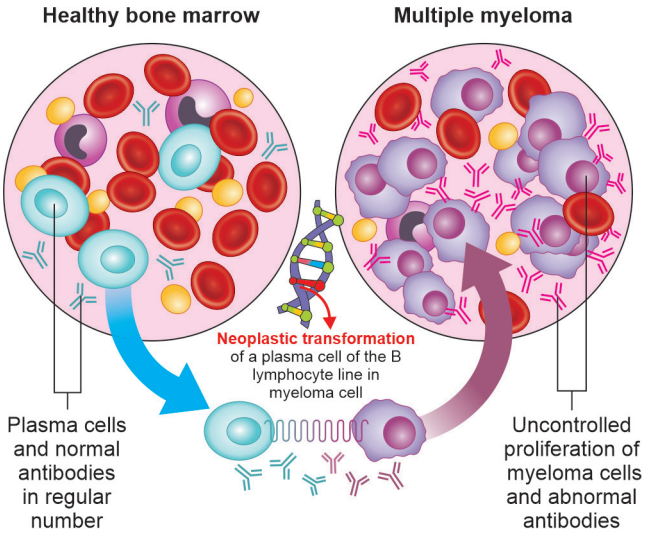
215. Ans. (b) The person is malingering

Ref: Review of Forensic Medicine and Toxicology by Gautam Biswas, 4th ed. pg. 546

- This seems to be a case of body packer. His symptoms are consistent with his condition. Therefore malingering will be least likely option here.
- A body packer is someone who carries drugs such as heroin or cocaine, packed in rubber or plastic, in his/her body in order to smuggle them.
- These people can present with symptoms that vary from mild abdominal complaints to respiratory insufficiency and even death.
- Physical examination and additional radiology tests are helpful for the diagnosis. Any packages can usually be seen on a plain abdominal X-ray. Detailed information on the number of drug packages, their exact location in the gastrointestinal tract and complications, such as small intestine obstruction or perforation, can be derived from a CT scan. Loss of consciousness can be explained by rupture of bag and absorption of contents into systemic circulation.

normally produces antibodies. Often, no symptoms are noticed initially. As it progresses, bone pain, anemia, kidney dysfunction, and infections may occur. Complications may include amyloidosis.

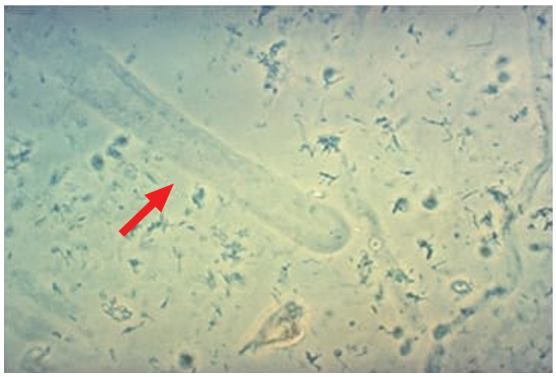
- Multiple myeloma is diagnosed based on blood or urine tests finding abnormal antibodies, bone marrow biopsy finding cancerous plasma cells, and medical imaging finding bone lesions. Another common finding is high blood calcium levels.



19. Ans (c) Hyaline cast

Ref: Robbins and Cotran Pathologic Basis of Disease, 10th ed. pg. 914

- Hyaline casts are the simplest and most common type of urinary cast. Urinary casts are microscopic clusters of urinary particles, such as cells, fat bodies, or microorganisms, wrapped in a protein matrix and found in the urine.
- "The hyaline cast is made of Tamm-Horsfall protein—the most abundant protein in the urine."



Question 37

Tzank smear with multinucleated giant cells. lesions present on lips. Triggered by fever.?

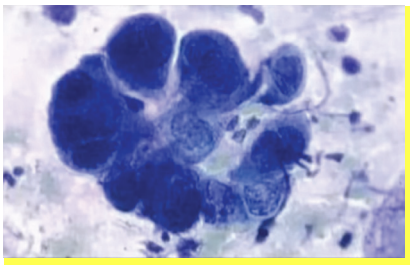
(FMGE JULY 2024)

a. Herpes
b.
c.
d.

20. Ans (a) HSV-1 and 2

Ref: Robbins and Cotran Pathologic Basis of Disease, 10th ed. pg. 1162

- The Tzanck smear is a quick and reliable tool for the evaluation of various erosive and vesiculobullous skin lesions.
- Tzanck cells (acantholytic cells) are found in:
  - Herpes simplex
  - Varicella and herpes zoster
  - Pemphigus vulgaris
  - Cytomegalovirus



21. Ans (a) Hereditary spherocytosis

Ref: Robbins and Cotran Pathologic Basis of Disease, 10th ed. pg. 640

Splenectomy is the definitive treatment for Hereditary spherocytosis (HS). Except in the unusual autosomal recessive variant of HS, splenectomy usually eliminates hemolysis and the associated signs and symptoms.

Other options:

- **G6PD deficiency:** The main treatment for G6PD deficiency is avoidance of oxidative stressors. Rarely, anemia may be severe enough to warrant a blood transfusion.
- **Iron deficiency anemia:** It is treated by iron supplements. Either oral or parental or IV.
- **Vitamin B_{12} deficiency anemia:** It is treated by B_{12} supplementation or IM injection of cyanocobalamin.

22. Ans (a) GPS

Ref: Robbins and Cotran Pathologic Basis of Disease, 10th ed. pg. 913

- Goodpasture's syndrome (GPS) or antiglomerular basement membrane disease is a rare autoimmune disease in which antibodies attack the basement membrane in lungs and kidneys, leading to bleeding from the lungs, glomerulonephritis, and kidney failure.
- It is thought to attack the alpha-3 subunit of type IV collagen, which has therefore been referred to as Goodpasture's antigen. Goodpasture syndrome may quickly result in permanent lung and kidney damage, often leading to death.

69. Ans. (d) All of these

Ref: Robbin's Pathology, 9th ed. pg. 48

- Catalase is present in peroxisomes and decomposes H_2O_2 into O_2 and H_2O.
- Superoxide dismutase is found in many cell types and converts superoxide ions to H_2O_2. This group includes both manganese-superoxide dismutase, which is localized in mitochondria, and copper-zinc-superoxide dismutase, which is found in the cytosol.
- Glutathione peroxidase also protects against injury by catalyzing free radical breakdown.

70. Ans. (c) Vasodilation and increase in permeability

Ref: Robbin's Pathology, 9th ed. pg. 73

- Hallmark of acute inflammation is ***increased vascular permeability*** leading to the escape of protein-rich exudate into the extravascular tissue, causing edema.

71. Ans. (b) Myeloperoxidase

Ref: Robbin's Pathology, 9th ed. pg. 82-83

Myeloperoxidase (MPO) is an enzyme present in primary (or azurophilic) granules of the neutrophils. In the presence of a halide such as $C1^-$, MPO converts H_2O_2 to HOCl (hypochlorous radical) during the process of respiratory burst.

Question 38

Marker in acute inflammation?

(FMGE JULY 2024)

a. NADPH oxidase
b. MPO
c.
d.

73. Ans. (a) NADPH oxidase

Ref: Robbin's Pathology, 9th ed. pg. 79

- The generation of reactive oxygen intermediates is due to the rapid activation of an enzyme; NADPH oxidase which is involved in oxygen dependent killing.
- Catalase, superoxide dismutase and glutathione peroxidase are free radical scavengers that prevent oxygen mediated injury.

74. Ans. (d) Vitamin C

Ref: Robbin's Pathology, 9th ed. pg. 8

- As the collagen molecule is produced, it undergoes many changes, termed post-translational modifications.
- These modifications take place in the Golgi compartment of the ER.
- Collagen, like most proteins that are destined for transport to the extracellular spaces for their function or activity, is produced initially as a larger precursor molecule called procollagen.
- Procollagen contains additional peptides at both ends that are unlike collagen. On one end of the molecule, called the amino terminal end, special bonds called disulfide bonds are formed among three procollagen chains and ensure that the chains line up in the proper alignment. This step is called registration. Once registration occurs, the three chains wrap around each other forming a string-like structure.
- One of the first modifications to take place is the very critical step of hydroxylation of selected proline and lysine amino acids in the newly synthesized procollagen protein.

75. Ans. (c) Calcification

Ref: Robbin's Pathology, 9th ed. pg. 40-41, 65

- Cellular swelling may occur due to cellular hypoxia, which damages the sodium-potassium membrane pump; it is reversible when the cause is eliminated.
- Cellular swelling is the first manifestation of almost all forms of injury to cells.
- On microscopic examination, small clear vacuoles may be seen within the cytoplasm; these represent distended and pinched-off segments of the endoplasmic reticulum.
- This pattern of non-lethal injury is sometimes called hydropic change or vacuolar degeneration.
- The ultrastructural changes of reversible cell injury include: Blebbing blunting, distortion of microvilli, loosening of intercellular attachments, mitochondrial changes, dilation of the endoplasmic reticulum.

76. Ans. (b) Liver

Ref: Robbin's Pathology, 9th ed. pg. 50-51

- In fat necrosis the enzyme lipase releases fatty acids from triglycerides.
- The fatty acids then complex with calcium to form soaps. These soaps appear as white chalky deposits.
- It is usually associated with trauma of the pancreas or acute pancreatitis.
- It can also occur in the breast, the salivary glands, neonates after a traumatic delivery but rarely in peritoneum.

77. Ans. (c) Lymphocytes, plasma cells and fibrosis

Ref: Robbin's Pathology, 9th ed. pg. 93

Question 39

A 35 year old male with testicular mass. Gross image provided? *(FMGE JULY 2024)*

a. seminoma
b. yolk sac tumor
c. teratoma
d. choriocarcinoma

93. Ans. (a) Seminoma

Ref: Robbins and Cotran Review of Pathology E-Book pg. 327

- OCT4 is an octamer-binding transcription factor expressed in undifferentiated pluripotent cells including germ cells and embryonic stem cells.
- Seminoma is the most common pure GCT in the testis and accounts for 35% to 50% of all testicular tumors. The mean age of patients is approximately 40 years.
- Most seminomas are discovered as painless testicular masses. Grossly, seminoma is usually well circumscribed and homogenous.

94. Ans. (b) Retinoblastoma

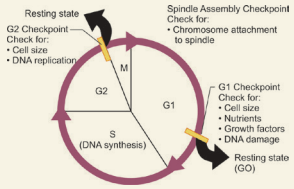
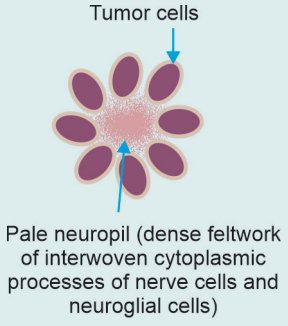
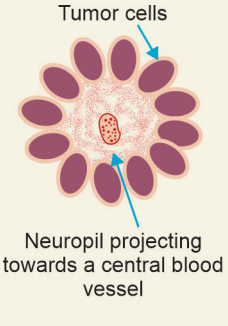
Ref: AK Khurana Ophthalmology pg. 317

- Retinoblastoma presents as leukocoria/ white pupil.
- Direct interference of the normal red reflex from opacities and abnormalities occurring anywhere from the cornea through to the posterior pole can create the leukocoric reflex. Like in the image shown, the white retinal mass seen in retinoblastoma creates leukocoria.
- Option A presents with orbital mass. Option C is usually bilateral. Option D presents with abdominal lump in neonates and intra-abdominal calcification.

95. Ans. (a) Retinoblastoma

Ref: Robbins 10th ed. pg. 1377

The image shows small round cells with Hyperchromatic nuclei surrounding a clear lumen and are called Flexner-Wintersteiner Rosettes.

Flexner-Wintersteiner	Homer wright rosettes	Perivascular pseudorosettes
Retinoblastoma	**PNM: Mnemonic** **P**ineoblastoma **N**euroblastoma **M**edulloblastoma	Ependymoma
		

96. Ans. (d) Burkitt lymphoma

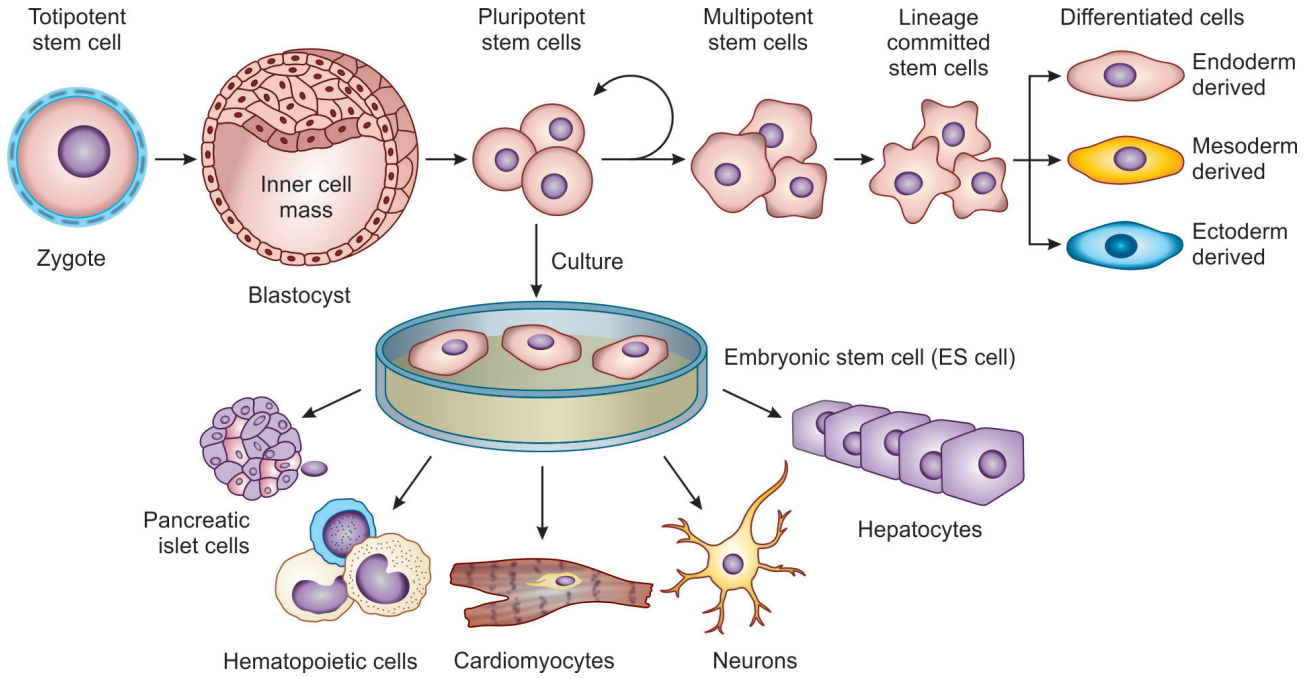
Ref: Harrison 20th ed. pg. 774

- The clinching point for diagnosis is starry sky appearance on lymph node biopsy in a child with jaw swelling. This is a feature of Burkitt lymphoma.
- The slide shows tightly packed immature intensely basophilic cells with some areas in between showing scattered macrophages phagocytizing cell debris and apoptotic cells.
- Option A is ruled out as Reed Sternberg cells are not seen.
- Option B is ruled out as history of sore throat and splenomegaly is not present
- Option C is ruled out as it presents with painless cervical lymphadenopathy with necrosis, karyorrhectic debris, and the presence of the typical cell types, namely crescentic histiocytes and plasmacytoid monocytes.

97. Ans. (c) Carcinoma prostate

Ref: Harrison 20th ed. pg. 624-25

- The presence of osteoblastic changes in LS spine indicates metastasis from carcinoma prostrate.
- Option A has bony lytic lesions. Option B shows focal reduction in joint space with development of gibbus. Option D also has lytic lesions and is ruled out.



106. Ans. (c) Teratoma

Ref: Robbins 9th ed. pg. 977

All tumors that produce α-fetoprotein have hyaline globules. These are eosinophilic round bodies found in following causes:

Malignant causes	Benign causes
• Yolk sac tumor • Hepatocellular carcinoma • Clear cell carcinoma • Kaposi sarcoma • Choroid plexus carcinoma • Adenoid cystic carcinoma	• Meningioma • Pleomorphic adenoma • α-1 anti-trypsin deficiency

107. Ans. (a) Lung cancer

Question 40

What is the most common cancer of females in India?

(FMGE JULY 2024)

a. Breast cancer
b. Cervical cancer
c. Ovarian cancer
d. Colorectal cancer

108. Ans. (d) Lung cancer

Ref: Harrison 19th ed. pg. 467

- The most common cancer leading to death in both males and females.
- The prevalence of carcinoma lung as contributor to death in males is 28% as compared to prostate cancer as 10%.
- The prevalence of carcinoma lung as contributor to death in females is 26% compared to breast cancer as 15%.

Distribution of *Cancer releted deaths*

Male (%)		Female(%)	
Lung	28	Lung	26
Prostate	10	Breast	15
Colorectal	8	Colorectal	9
Pancreas	7	Pancreas	7

Extra Mile

GLOBOCAN 2020 mentions female Breast cancer as most commonly diagnosed cancer. The same data is present on WHO website lung cancer remains the leading cause of cancer death.

109. Ans. (a) Comedo subtype of DCIS

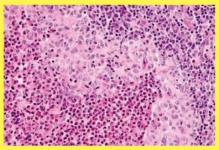
Ref: Robbins E-book, pg. 743

- The distinctive *comedo-subtype is characterized by extensive central necrosis.*
- This produces necrotic tissue with tooth paste consistency.
- Calcifications are frequently encountered in DCIS due to *calcification of necrotic tissue and are easily picked up by mammography.*

Question 41

Image based question on langerhans cell

(FMGE JULY 2024)



a.
b.
c.
d.

212. Ans. (a) CD1

Ref: Robbin's Pathology, 9th ed. pg. 590

- Langerhans cells are characterized by two types of markers: an ultrastructural marker, the **Birbeck granule** and different membrane markers: **HLA-D antigens, T4 antigen, and some of the CD1 antigens.**
- These antigens which are specific for the epidermal Langerhans cells, are not expressed by the other epidermal cells. Three CD1 antigens are biochemically defined on human thymocytes, they display a glycoprotein chain non covalently attached to beta-2-microglobulin.

213. Ans. (a) Iron

Ref: Robbin's Pathology, 9th ed. pg. 631, 649

214. Ans. (d) Viral or protozoal infection

Ref: Robbin's Pathology, 9th ed. pg. 582-83

- Leucocytosis is seen with viral infections on account of increase in number of natural killer cells.

Leucopenia MNEMONIC _ VINDICATE

V- Vascular causes like MI
I- Infection like sepsis
N- Neoplasm like CLL
D-
I- DRUG INTOXICATION like lithium
C- Congenital like DOWN
A- Autoimmune like polyarteritis nodosa.
T- Trauma
E - Endocrinologic causes like cushing's disease

215. Ans. (b) Africa

Ref: Robbin's Pathology, 9th ed. pg. 588

- Globally, Burkitt lymphoma (BL) is endemic in certain regions of equatorial Africa and other tropical locations between latitudes 10° south and 10° north. Incidence in these areas of endemic disease is 100 per million children.
- Epstein-Barr virus (EBV) infection is found in nearly all areas. In endemic areas, there seems to be a correlation with the geographic distribution of endemic malaria.
- Malaria infection also probably plays a role in the pathogenesis of BL, as it can lead to inhibition of EBV-specific immune response. The exact mechanism of EBV-mediated lymphomagenesis, however, is not well understood, but evidence exists for a significant interaction between viral and cellular microRNA (miRNA) interfering with normal gene expression and translation. EBV can be detected in 25–40% of immunodeficiency-associated cases.

216. Ans. (c) Chronic renal failure

Ref: Robbin's Pathology, 9th ed. pg. 631-35, 638

- The same question was asked in different exams with different choices.
- Choices a, b, d are examples of hemolytic anemias and hence the answer by exclusion is chronic renal failure.
- CRF has low erythropoietin levels due to less production and has normocytic normochromic anaemia.

217. Ans. (a) GLUT 1

Ref: Harrison's, 19th ed. pg. 2402

Basic Rule

- **GLUT 1 and 3** = Everywhere in body (for Basal Absorption of Glucose) including RBC
- **GLUT 2** = In liver and pancreas
- **GLUT 4** = In muscle and adipose

Energy-yielding metabolism in erythrocytes depends on a constant supply of glucose from the blood plasma, where the glucose concentration is maintained at about 5 mm. Glucose enters the erythrocyte by facilitated diffusion via a specific glucose transporter, at a rate about 50,000 times greater than un-catalyzed transmembrane diffusion.

218. Ans. (a) Chronic ITP

Ref: Robbin's Pathology, 9th ed. pg. 658-59

- Splenectomy may be done in patients with chronic ITP, as platelets which have been bound by antibodies are taken up by macrophages in the spleen (which have Fc receptors).
- Durable remission following splenectomy is achieved in 60–65% of ITP cases, less so in older subjects. However, the use of splenectomy to treat ITP has diminished since the development of steroid therapy and other pharmaceutical remedies.

Remember

Drug treatment in ITP

- *Steroids* and steroid sparing agents
- ***Anti–D:*** Suitable for Rh-positive, non-splenectomized patients is intravenous administration of Rho(D) immune globulin. Following administration, anti-D-coated red blood cell complexes saturate Fcγ receptor sites on macrophages, resulting in preferential destruction of red blood cells, therefore sparing antibody-coated platelets.
- ***Romiplostim:*** A thrombopoiesis stimulating Fc-peptide fusion protein that is administered by subcutaneous injection.

- Investigation of choice for multiple myeloma is bone marrow biopsy
- Screening test for multiple myeloma is serum electrophoresis showing M spike
- Most common cause of death in multiple myeloma is infections
- Most common cause of kidney damage in multiple myeloma is hypercalcemia.

CARDIOVASCULAR PATHOLOGY

237. Ans. (a) LDH1

Ref: Robbins 10th ed. pg. 553

- LDH-1: Present primarily in cardiac myocytes and erythrocytes.
- LDH-2: Present mostly in white blood cells.
- LDH-3: Present in highest quantity in lung tissue.
- LDH-4: Highest amounts found in pancreas, kidney, and placenta.
- LDH-5: Highest amounts found in liver and skeletal muscle.
- In blood, LDH-2 is > than LDH-1 value, but in cardiac tissue LDH-1 is prodominant

238. Ans. (b) Intimal elastic lamina layer defect

Ref: Harrison 20th, ed. pg. 2084

As an aneurysm develops, it typically forms a neck with a dome. The length of the neck and the size of the dome vary greatly and are important factors in planning neurosurgical obliteration or endovascular embolization.

Question 42

Earliest marker to detect in MI?

(FMGE JULY 2024)

a. CKMB
b. Troponin
c. LDH
d. Myoglobin

239. Ans. (a) Troponin I

Ref: Harrison 20th ed. pg. 384

Cardiac specific markers of myocardial damage include quantitative determination of CK-MB, Troponin I and Troponin T. Troponins can become elevated by 3 hours. The circulating values remain elevated up to a week.

240. Ans. (a) AS0

Ref: Nelson 20th ed. pg. 1333

Because other illnesses may closely resemble Acute rheumatic fever, antecedent group A Streptococcal Infection is needed whenever possible. The tests are:

- Increasing or rising Anti-Streptolysin O titer or other streptococcal antibodies indicates recent streptococcal infection
- A Positive throat Culture
- A Positive Rapid group streptococcal carbohydrate antigen test in a child

Extra Mile

TABLE: Guidelines for the Diagnosis of Initial or Recurrent Attack of Rheumatic Fever (Jones Criteria, Updated 2015)

Major manifestations	Minor manifestations	Supporting evidence of antecedent group a streptococcal infection
Carditis Polyarthritis Erythema marginatum Subcutaneous nodules Chorea	Clinical features: Arthralgia Fever Laboratory features: Elevated acute phase reactants: Erythrocyte sedimentation rate C-reactive protein Prolonged P-R interval	Positive throat culture or rapid streptococcal antigen test Elevated or increasing streptococcal antibody titer

241. Ans. (a) Endocardial cushion defect

Ref: Nelson 20th ed. pg. 2165

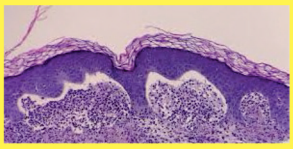
Syndrome	Features
CHROMOSOMAL DISORDERS Trisomy 21 (Down syndrome) Trisomy 21 p (cat eye syndrome) Trisomy 18 Trisomy 13	Endocardial cushion defect, VSD, ASD Miscellaneous, total anomalous pulmonary venous return VSD, ASD, PDA, coarctation of aorta, bicuspid aortic or pulmonary valve VSD, ASD, PDA, coarctation of aorta, bicuspid aortic or pulmonary valve

FMGE SOLUTIONS

Question 43

Dermatitis herpetiformis associated with which of the following intestinal pathology? *(FMGE JULY 2024)*

a. Ulcerative colitis
b. Whipple's disease
c. Celiac disease
d. Crohn disease



336. Ans. (c) Celiac disease

Ref: Robbins, 9th ed. pg. 783

HPE Findings of Celiac Disease

- Biopsy specimens from the second portion of the duodenum or proximal jejunum, which are exposed to the highest concentrations of dietary gluten, are **generally diagnostic in celiac disease.**
- The histopathology is characterized by increased numbers of intraepithelial CD8+ T lymphocytes (**intraepithelial lymphocytosis**), crypt hyperplasia, and **villous atrophy.**

337. Ans. (b) Amylase

Ref: Sabiston, 19th ed. pg. 1524-1525, 1531; Schwartz, 9th ed. pg. 1200-1203; Bailey, 26th ed. pg. 1133-1134

PSEUDOPANCREATIC CYST

- A chronic collection of pancreatic fluid surrounded by a non-epithelialized wall of granulation tissue and fibrosis
- Pseudo-cysts account for 75% of cystic lesions of the pancreas.
- MC complication of chronic pancreatitis.

- Located anywhere from the mediastinum to the scrotum
- Found most often in the lesser sac or anterior para-renal space
- Traumatic pseudocysts tend to occur anterior to the body of the gland
- Chronic pancreatitis pseudocysts are commonly located within the substance of the gland

- Alcohol is the MC cause of pancreatitis related pseudo-cysts

Diagnosis

- No definitive laboratory findings are available to establish a diagnosis of pancreatic pseudocyst.
- ***Elevated serum amylase and lipase concentrations may occur in half of these patients.***
- *Persistently elevated amylase after resolution of acute pancreatitis should prompt investigation for a pseudocyst.*
- CECT abdomen is investigation of choice for diagnosis of a pancreatic pseudocyst.

338. Ans. (d) Hypertension

Ref: Robbin's Pathology, 9th ed. pg. 884-86

- Acute pancreatitis is seen chiefly in males after age 40 and often associated with obesity and alcoholism.
- In about 50% of the cases, gallstones are also present.
- Pancreatitis occurs in about 10% of cases of hyperparathyroidism.
- Long term thiazides can also contribute to development of pancreatitis.
- In some cases calculi resulting from the hypercalcemia of hyperparathyroidism develop in pancreatic ducts and lead to obstruction and inflammation.

339. Ans. (c) Chronic gastritis

Ref: Robbin's Pathology, 9th ed. pg. 763, 804

- Gastric polyps are not common.
  When they occur, they are usually hyperplastic polyps consisting of hyperplastic mucosal epithelium over an inflamed edematous stroma.
- They are most often seen in association with the chronic mucosal damage found in chronic gastritis.

340. Ans. (d) Pernicious anemia

Ref: Robbin's Pathology, 9th ed. pg. 764

- Antiparietal cell antibodies are found in patients with pernicious anemia.
- The antineutrophilic cytoplasmic antibodies are found in patients with Wegener granulomatosis.
- Wegener granulomatosis may also present with pulmonary and renal involvement but will have associated upper respiratory tract findings, e.g, sinusitis and sinus abscesses.

341. Ans. (d) Majority seen in duodenum

Ref: Robbin's Pathology, 9th ed. pg. 775-76

- Majority of gastrointestinal stromal tumours originate from *stomach*. The cell of origin is interstitial cell of Cajal which are present in muscularispropria.
- The useful marker is c-kit (CD 117) detectable in 95% of patients.
- PET scan is the imaging modality of choice
- Treatment is tyrosine kinase inhibitors like imatinib mesylate.

342. Ans. (d) Coagulative necrosis

Ref: Robbin's Pathology, 9th ed. pg. 795-96

- The typical flask shaped ulcer in amoebiasis is due to liquefactive necrosis affecting caecum and ascending colon and rectum.

7. Ans. (a) 5-alpha-reductase inhibitor

Ref: Goodman and Gilman's The Pharmacological Basis

Question 44

A 28 year old HIV positive patient was complaining of cough, fever and tachypnea. His chest X-Ray shows B/L infiltration and CD4 count was below 200. What is the likely diagnosis in this case and what drug will you prescribe to him?

(FMGE JULY 2024)

a. Pneumocystis carinii, cotrimoxazole
b. Toxoplasma gondii, TMP-SMX
c. Aspergillus, Albendazole
d. Candida, fluconazole

8. Ans. (c) Ganciclovir

Ref: Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th ed. pg. 1211–1459

- The given clinical picture is of patient with CMV retinitis.
- Drugs used for treatment of CMV retinitis are:
  - Ganciclovir, Valganciclovir (Prodrug): DOC. It is available in IV and in implant form.
  - Alternatively, Cidofovir and Foscarnet can also be used.
- **Note:**
  - Aciclovir is DOC in HSV infection. It is ineffective in CMV.
  - Cotrimoxazole is preferred in HIV patients with *Pneumocystis jirovecii* infection
  - Tenofovir is a nucleotide reverse transcriptase inhibitor (NRTI). Used in HIV and HBV.

9. Ans. (a) Phenelzine

Ref: Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th ed. pg. 113–346

- The given clinical picture of cheese reaction is seen when a tyramine-rich food is given to patients on MAO inhibitor.
- **Example of MAO inhibitors:**
  - MAO-a inhibitors: **Moclobemide**
  - MAO-b inhibitors: **Selegiline, rasagiline, safinamide**
  - Nonselective MAO inhibitors: **Phenelzine, tranylcypromine, isocarboxazid**
- **Examples of tyramine-rich food are:** Cheese, curd, any sweets or food made of milk, soya sauce, fermented meet, banana, beef, red wine, white wine, canned bear.

10. Ans. (c) Tardive dyskinesia

Ref: Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th ed. pg. 378–79

- Tardive dyskinesia is an EPS seen due to typical antipsychotics like Haloperidol, Droperidol, Flupentixol, Zuclopenthixol
- Other mentioned ADRs are seen with lithium therapy.
- Most common ADR seen with lithium: Tremor

11. Ans. (c) Acetazolamide

Ref: Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th ed. pg. 562–63

- For the treatment of mountain sickness, preferred agent is carbonic anhydrase inhibitor like **Acetazolamide** is used.
- It causes HCO_3 washout in urine leading to metabolic acidosis and CSF acidosis, which induces hyperventilation → this causes CO2 washout. This prevents altitude sickness.

12. Ans. (b) Nuclear receptor

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 68–69

- Thyroid hormone acts through nuclear receptor superfamily. Example of nuclear receptor-mediated action is seen with:
  - Thyroxine (T3, T4), Retinoic acid receptor (vitamin A), PPAR (Peroxisome proliferator-activated receptor).
- Examples of ligand-gated receptors are: GABA (a and c), Nicotinic receptor, NMDA, 5HT3
- Examples of GPCR: Alpha-receptor, beta-receptor, muscarinic receptor, dopamine receptor, histamine receptor.
- Examples of enzymatic receptors: Growth hormone, insulin, prolactin, interleukin, interferon.

13. Ans. (a) Prednisolone

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 1017–20

- For the facial palsy, steroid like prednisolone is preferred.
- Steroid is anti-inflammatory agent, which reduces inflammation and edema around the nerve.

14. Ans. (c) Erythromycin

Ref: Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th ed. pg. 1144, 1186

- Erythromycin is a macrolide antibiotic, which is effective in gram-positive bacteria, gut anaerobes and in patients allergic to penicillin.
- It is not effective in bacterial vaginosis.

Drugs used for bacterial vaginosis are:

- Metronidazole

Question 45

DOC in pregnancy for treatment of vomiting

(FMGE JULY 2024)

a. Domperidone
b. High fluid intake
c. Small meal
d. metoclopramide

41. Ans. (a) Granisetron + Dexamethasone + Aprepitant

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 1100, 1102, 1103

- For the management of chemotherapy-induced nausea and vomiting, the preferred agent is 5HT3 antagonist like Ondansetron, Granisetron, Palonosetron.
- Other agents that can be used are:
  - **NK1/Substance P antagonist:** Aprepitant, Rolapitant. It is preferred in chemotherapy-induced delayed nausea and vomiting.
  - **Steroid-like Dexamethasone** also reduces the emesis possibly due to its anti-inflammatory, interaction with 5HT3 and NK1 and NK2 receptors. It also reduces intracranial pressure which adds in alleviating symptoms like nausea and vomiting. Exact mechanism is unclear.
  - **Domperidone** is a D2 antagonist that can be used due to its prokinetic property. But this is not used in combination with another D2 antagonist like Metoclopramide.

42. Ans. (a) Bupropion

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 349–50, 354

- Antidepressants like SSRI (Escitalopram, Fluoxetine), SNRI (Venlafaxine) and TCA (Imipramine) are associated with sexual side effects like delayed ejaculation, anorgasmia and decreased libido.
- Receptor modulators like Bupropion are not reported with such sexual side effects.

Extra Mile

- **Bupropion** is 5HT receptor modulator with Nicotine receptor partial agonistic property. It is most preferred agent in depressed patient with smoking dependence.

43. Ans. (a) Hemodialysis is not useful in this patient

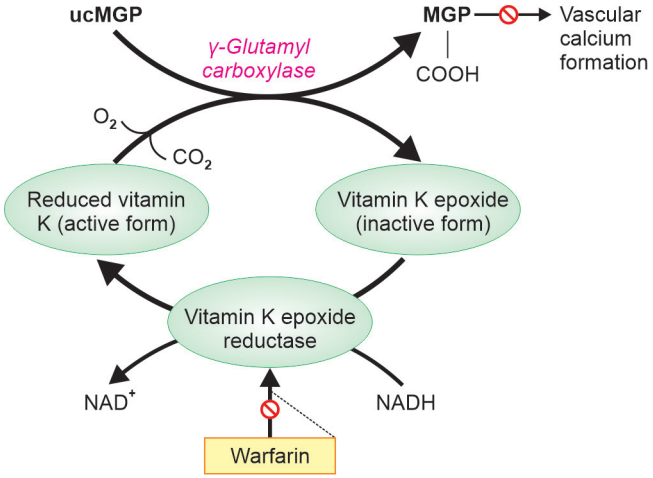
Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 379–80

- Lithium is considered DOC for management of Mania. It is a drug with narrow therapeutic index and hence TDM is always required with use of lithium.
- If there is toxicity with lithium, preferred treatment modality is hemodialysis.
- **Side effect of lithium** ***(Mn: LITTH)***
  - Leukocytosis
  - Insipidus diabetes
  - Tremor (Fine > Coarse at toxic doses)
  - Teratogenic (can cause Ebstein anomaly if exposed during pregnancy)
  - Hypothyroidism
- **Interaction with lithium and thiazides**
  - Thiazide causes natriuresis. As a compensatory mechanism, there will be increased Na^+ reabsorption along with lithium. Hence with diuretics, there will increase in risk of lithium toxicity.

44. Ans. (b) It acts by inhibiting Vitamin K epoxide reductase which is involved in activation of clotting factor II, VII, IX, X

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 716

- Dicumarol/Coumadin also known as warfarin acts as competitive inhibitor of vitamin K-dependent factors like 2, 7, 9, and 10.



Extra Mile

- Streptokinase is a tissue plasminogen activator (tPA), used as fibrinolytic agent.
- Heparin acts by increasing AT3 activity, which binds to factor IIa and factor Xa.

45. Ans. (b) Liposomal amphotericin B

Ref: Goodman and Gilman's the Pharmacological Basis of Therapeutics, 14th ed. pg. 1312

- In a patient with cryptococcal meningitis, preferred drug is Liposomal Amphotericin B (LAMB).
- Fluconazole is used only after a 2-week IV dose of LAMB which reduces the fungal load.
- 5-Flucytosine is also effective in cryptococcal meningitis. Given as an add-on drug with LAMB.
- Voriconazole is DOC for aspergillosis.

259. Ans. (d) Aztreonam

Ref: KDT, 6th ed. pg. 708

- β lactams contain a β lactam ring and another one is 2nd ring.
- 4 types of β lactams based on 2nd ring:
  - Penicillins *(ampicillin)*
  - Cephalosporins *(cefotaxim)*

Question 46

Which of the following is topical use of shown agent:

(FMGE JULY 2024)

a. Subglottic stenosis
b. Type 1 myringoplasty
c. Post adenoidectomy to control bleeding
d. Rhino cerebral mucormycosis

260. Ans. (b) Mupirocin

Ref: KDT, 6th ed. pg. 733-34

- **Aminoacyl-tRNA synthetases (aaRSs)** are enzymes that catalyze the transfer of amino acids to their cognate tRNA. They play a pivotal role in protein synthesis and are essential for cell growth and survival.
- Mupirocin, a natural product of Pseudomonas fluorescens, is the only aaRS inhibitor approved by the US Food and Drug Administration to this date.
- It is active against gram-positive cocci, including methicillin-susceptible and methicillin-resistant strains of *Staphylococcus aureus*. Mupirocin inhibits staphylococcal isoleucyl tRNA synthetase.
- Mupirocin is indicated for topical treatment of minor skin infections, such as impetigo.

Extra Mile

Methenamine mandelate is the salt of mandelic acid and methenamine and possesses properties of urinary antiseptics. It doesn't treat UTI, but it suppresses.
Mitomycin C is antitumor antibiotics.
Metronidazole, an antibiotic for anaerobes.

261. Ans. (a) Injection Benzathine penicillin 2.4 million units IM single dose

Recommended treatment for syphilis

Stage of syphilis	Treatment	Comment
Early Primary, secondary, or early latent	**Benzathine penicillin G 2.4 MU, IM more**	
Late latent or uncertain duration	Benzathine penicillin G 2.4 million units 1M weekly for 3 wk	
Tertiary without neurophilis	Benzathine penicillin G 2.4 million units N weekly for 3 weeks	Cerebrospinal fluid evaluation recommended in all patients
Neurosyphilis	Aqueous penicillin G 18-24 million units IV daily, given every 3-4 hours or as continuous infusion for 10-14 days	Follow treatment with benzathine penicillin G 2.4 million units 1M weekly for up to 3 weeks

Contd...

262. Ans. (b) Azithromycin

Ref: KDT, 6th ed. pg. 730-31; Katzung, pg. 1172

- Azithromycin is new congener of erythromycin with expanded spectrum and improved pharmacokinetics.
- Because of its higher efficacy, better gastric tolerance and convenient once a day dosing, it is preferred over erythromycin as first line drug of choice for infections such as *(Mn: CHAL MD):*
  - Chancroid
  - Chlamydia Trachomatis- 1 gm single dose is curative.
  - H. Influenzae
  - Atypical mycobacteria, Atypical pneumonia (by chlamydia)
  - Legionella
  - Moraxella catarrhalis
  - Donovanosis
- Erythromycin and clarithromycin are the macrolides with similar antimicrobial spectrum. But clarithromycin have action against mycobacterium avium complex (MAC), atypical mycobacteria and M. leprae, H.Influenzae, Toxoplasma gondii.

Extra Mile

- **Spiramycin:** Given in treatment of toxoplasma gondii to prevent transmission of infection from mother to fetus.

263. Ans. (c) Crystalluria

Ref: Sharma & Sharma 3rd ed. pg. 715

- Sulfonamides are structural analogue of PABA which enter the synthetic sequence of in place of PABA by competing with the enzyme dihydropteroic acid synthase and forms non-functional analogue of folic acid which is of no use to bacteria.
- Its growth ceases in absence of folic acid, hence these are bacteriostatic drugs.

Classification of sulfonamides:

- **Short acting** (t1/2- 6–9 hrs): Sulfacytine, Sulfadiazine, Sulfasoxazole, Sulfamethizole
- **Intermediate** (t1/2- 1–12 hrs): Sulfamethoxazole, Sulfamoxole

PYRAZINAMIDE

- It is weakly tuberculocidal. PYZ is more lethal to intracellularly located bacilli and to those at sites showing an inflammatory response.
- **MOA:** Resembles that of INH. It inhibits mycolic acid synthesis but by interacting with a different fatty acid synthase encoding gene.
- Resistance of PYZ due to mutation in *pncA gene.*
- **Adverse effects:** ***Hepatotoxicity***, nausea, vomiting, drug fever, and ***hyperuricemia***

ETHAMBUTOL

- Selectively tubecolostatic agent and clinically as active as streptomycin. *Fast multiplying bacilli are more susceptible* as are many atypical mycobacteria.
- **MOA:** Poorly understood, but it has been found to inhibit arabinosyl transferases involved in arabinogalactan synthesis and to interfere with mycolic acid incorporation

Question 47

A patient was given ATT intensive phase HRZE for 2 months and continuationphase HRE for 4 months. Patient developed colour vision defect and ocular pain and other visual symptoms. Which of the following drug is possible cause:

(FMGE JULY 2024)

a. Isoniazid
b. Rifampicin
c. Pyrazinamide
d. Ethambutol

297. Ans. (c) Increase the permeability of cell wall

Ref: KDT, 6th ed. pg. 742

- Ethambutol inhibits arabinosyl transferases which is involved in cell wall biosynthesis. By inhibiting this enzyme, the bacterial cell wall complex production is inhibited. ***This leads to an increase in cell wall permeability.***

Extra Mile

- **ATT** acting exclusively on intracellular bacilli: Pyrazinamide
- **ATT acting exclusively on extracellular bacilli: Streptomycin**

298. Ans. (d) Ethambutol

Ref: KDT, 6th ed. pg. 742

- **Side effect of Ethambutol:** Loss of visual acuity/color vision, field defects due to **optic neuritis** is the most important dose and duration of therapy dependent toxicity.

Extra Mile

- Important side effects of antitubercular drugs:
- Peripheral neuropathy (*due to vit B6 deficiency*): ISONIAZID
- Orange color urine- RIFAMPICIN
- Flu-like symptoms- RIFAMPICIN
- Hyperuricemia/gout- PYRAZINAMIDE
- Optic neuritis- ETHAMBUTOL
- Nephrotoxic, Ototoxic, Neuromascular Junction Blocker- STREPTOMYCIN

Other important points to remember about Anti TB drugs:

- *First line anti TB drugs are:* ***HRZE*** *(Isoniazid, Rifampicin, Pyrazinamide, Ethambutol)*
- All first line drugs are bactericidal EXCEPT- **Ethambutol** (it is bacteriostatic)
- Most hepatotoxic ATT-**Pyrazinamide**
- 1st line ATT with exclusive intracellular action-**Pyrazinamide**
- 1st line ATT with exclusive extracellular action-**Streptomycin**
- Which anti TB drugs are NOT hepatotoxic-**Ethambutol and Streptomycin.**

- It should not be used in children below 6 years of age because these young patients may not be able to report visual impairment.

299. Ans. (d) Ethambutol

Ref: KDT, pg. 742

- Ethalmbutol is selectively tuberculostatic and clinically as active as Streptomycin.

TABLE: 1st Line ATT Drugs action on bacteria and hepatoxicty

Drug	Bactericidal/ Bacteristatic	Hepatotoxicity
Isoniazid	Cidal	+
Rifampicin	Cidal	+
Pyrazinamide	Cidal	++++
Ethambutol	STATIC	- No
Streptomycin	Cidal	- No

300. Ans. (d) Ethambutol

Ref: Katzung's Pharmacology, 14th ed. pg. 846

- **Dose of Ethambutol:** 15-25 mg/kg OD dose.
- About 20% drug is excreted in feces and 50% in urine in unchanged form.
- ***Ethambutol accumulates in renal failure, and the dose should be reduced by half if creatinine clearance is less than 10 mL/min.***
- **Side effect:** Most common serious adverse event is retro-bulbar neuritis, resulting in loss of visual acuity and ***red green color blindness*** *(Patient develop BLUE VISION).*

- SLE
- Non-Hodgekins lymphoma

Note:

- Omalizumab (option A) is MAB against IgE. It is used for bronchial asthma
- Denosumab (option B) is MAB against RANK ligand and prevents activation of osteoclast. It is used in osteoporosis.
- Methotrexate (option D) is DHFR inhibitor (NOT a MAB) used in multiple conditions like rheumatoid arthritis, psoriasis, as immunosuppressant and in some cancers like choriocarcinoma, osteosarcoma, etc.

317. Ans. (a) Anthracyclines

Ref: Katzung 14th ed. pg. 964-65

- Anthracyclines are cell cycle non-specific anti-cancer drugs. It is one of the anti-tumor antibiotics.
- **Drugs under anthracyclines are:**
  - Doxorubicin
  - Daunorubicin
  - Epirubicin
  - Valrubicin
- **Side effect:** Cardiotoxicity, Nausea, Vomiting, Alopecia, Bone marrow suppression.
- **Upon HPE of heart:** Vacuolar degeneration of myofibrils.

318. Ans. (c) 5FU

Ref: SRB 5th ed. pg. 987

Chemoradiation is the preferred treatment of anal cancer. 5FU is the preffered drug. Initially radiation is given for 3 weeks to the perenium and pelvis. This is followed by chemotheraphy using 5FU and mitomycin C.

319. Ans. (b) Dihydrofolate reductase inhibitor

Ref: Goodman & Gillman's 13th ed. pg. 1179

- Pemetrexed is a most recent folate analogue which is avidly transported into cells via the reduced folate carrier and is converted to its metabolite (PGs- Polyglutamate) that inhibit Thymidylate synthase and glycine amide ribonucleotide transformylase, as well as DHFR. (Dihydrofolate Reductase)
- It is even more potent than methotrexate.
- Like MTX, it induces p53 and cell-cycle arrest, but this effect does not depend on induction of p21.
- **Use:** It has activity against ovarian cancer, mesothelioma, and adenocarcinomas of the lung.
- Other effects and side effects are similar to methotrexate like myelosuppression, GI toxicity. The toxicity can be attenuated with folate and vitamin B_{12} supplementation.

Extra Mile

- A newer congener, **pralatrexate**, is more effectively taken up and polyglutamated than MTX and is approved for treatment of CTCL peripheral T cell lymphoma.
- Pramipexole is an antiparkinsonism drug which is a dopamine agonist.

320. Ans. (a) Methotrexate toxicity

Ref: Goodman & Gillman's 13th ed. pg. 1177

- Folic acid is an essential dietary factor which is converted

Question 48

Which of the following is mechanism of action of methotrexate:

(FMGE JULY 2024)

a. Dihydrofolate reductase inhibitor
b. Folic acid synthase inhibitor
c.
d.

321. Ans. (b) Methotrexate

Ref: K.D. Tripathi, 6th ed. pg. 823

- Methotrexate is one of the oldest and highly efficacious antineoplastic drugs
- **MOA:** It inhibits dihydrofolate reductase (DHFRase)-blocking the conversion of dihydrofolic acid (DHFA) to tetrahydrofolic acid (THFA) which is an essential coenzyme required for one carbon transfer reactions in de novo purine synthesis and amino acid interconversions.
- **DHFRase inhibitors are:** methotrexate, Pemetrexed, Pralatrexate

Extra Mile

- Vincristine is a mitotic spindle formation inhibitor
- Paclitaxel is a spindle breakdown inhibitor
- Cisplatin is a platinum based compound.

322. Ans. (a) Nilotinib

Ref: KD Tripathi, 7th ed. pg. 870

- **Nilotinib** It is a second generation Bcr-Abl, PDGF-receptor β and c-kit receptor tyrosine kinase inhibitor with **20-50 fold higher affinity for these kinases than imatinib.** Thus, it can overcome resistance to imatinib due to Bcr-Abl mutation and is effective in chronic CML nonresponsive to imatinib.
- It is only 30% bioavailable orally, but absorption is improved by food. It is also useful in accelerated phase of CML. Thus, it is an alternative drug in imatinib non-tolerant or resistant cases of CML, and has now been used as a first-line drug as well.

- **Side effect:** pulmonary fibrosis and myelosuppression.
- *Please refer to above explanation for more details of alkylating agents.*

327. Ans. (d) All of these

Ref: KDT, pg. 819-20; Katzung, 11th ed. pg. 1280

Please refer to above explanation.

328. Ans. (b) Alkylating agent

Ref: Katzung, 14th ed. pg. 951; KDT, pg. 819-820

- Cyclophosphamide is the most widely used alkylating agent.
- It is an inactive compound. Transformation into active metabolite occurs in liver, and a wide range of anti tumor action is exerted.
- It has prominent immunosuppressant property, so it has been particularly utilized in bone marrow transplantation. In other organ transplants it is employed only as a reserve drug.
- **Drugs of different category are:**

Alkylating agents	Antimetabolites	Platinum compound	Topoisomerase inhibitors
Cyclophosphamide Ifosfamide Mechlorethamine *Melphalan* *Busulfan* Procarbazine **Nitrosourea** Carmustine Lomustine Semustine	**Folic acid antagonist** Methotrexate **Purine analogues** 6 Mercaptopurine 6 thioguanine ***Cladribine*** Fludarabine **Pyrimidine analogues** Capecitabin Gemcitabin **Cyatarabine** and 5 FU	Cisplatin Carboplatin Oxaliplatin	**TOPOISOMERASE- I** Irinotecam **TOPOISOMERASE-II** Etoposide Anthracycline Doxorubicin Daunorubicin

329. Ans. (c) Cytarabine

Ref: Katzung, 14th ed. pg. 951; KDT, 6th ed. pg. 820

- Cytarabine is pyrimidine analogue

Please refer to above explanation.

Extra Mile

- DOC for hairy cell leukemia- **CLADRIBINE**
- DOC for CLL- **FLUDARABINE**
- DOC for pancreatic CA- **GEMCITABINE**
- 6 Mercaptopurine metabolized by- **XANTHINE OXIDASE**
- **DOC** for choriocarcinoma- **METHOTREXATE**

330. Ans. (a) Purine analogue

Ref: Katzung, 14th ed. pg. 960; KDT, 6th ed. pg. 820

- Mercaptopurine is synthetic purine used in cancer chemotherapy.
- Use: Childhood acute leukemia.

331. Ans. (d) Cisplastin

Ref: KDT, 6th ed. 832; Katzung, 14th ed. pg. 956, 957

- Cisplatin is considered as first line chemotherapy in cervix CA and is very effective in metastatic testicular and ovarian carcinoma.
- Cisplatin is a platinum coordination complex that is hydrolyzed intracellularly to produce a highly reactive moiety which causes cross linking of DNA by platinum compound.
- The primary binding site is the N7 of guanine, but covalent interaction with adenine and cytosine also occurs.

Question 49

Which of the following is most preferred agent for GIST:

(FMGE JULY 2024)

a. Imatinib
b.
c.
d.

332. Ans. (a) Imatainib mesylate

Ref: KD Tripathi, 6th ed. pg. 828 & 832

IMATINIB

- DOC for CML & GIST - Imatinib Mesylate
- It inhibits the tyrosine protein kinases in chronic myeloid leukaemia (CML) cells and and c-kit receptor found in gastrointestinal stromal tumour (GIST).
- Adverse effects are fluid retention, edema, vomiting, abdominal pain, myalgia and liver damage

TABLE: Drugs of choice for some commonly asked malignancies

Malignancy	First line drugs
Chronic Lymphatic leukaemia	Fludarabine
Chronic Myeloid leukaemia	Imatinib
Hairy cell leukemia	CLADRIBINE
Multiple myeloma	Bortezomib > Melphalan
Choriocarcinoma	Methotrexate
Prostate carcinoma	Bicalutamide/Flutamide

Question 50

Which of the following is mechanism of action of methotrexate:

(FMGE JULY 2024)

a. Dihydrofolate reductase inhibitor
b. Folic acid synthase inhibitor
c.
d.

333. Ans. (a) Inhibit dihydrofolate reductase

Ref: Katzung, 14th ed. pg. 957; KD Tripathi, 6th ed. pg. 823

METHOTREXATE (MTX)

DHFA $\xrightarrow{\text{DHF Rase}}$ THFA

- Methotrexate is a highly efficacious antineoplastic drug which inhibits dihydrofolate reductase (DHFRase) enzyme- blocking the conversion of dihydrofolic acid (DHFA) to tetrahydrofolic acid (THFA).
- This conversion is essential for formation of an essential coenzyme required for one carbon transfer reactions in denovo purine synthesis and amino acid interconversions.
- Methotrexate has cell cycle specific action kills cells in S phase; primarily inhibits DNA synthesis.

Extra Mile

Drug of choice for Mtx toxicity: FOLINIC ACID.

334. Ans. (b) Folinic acid

Ref: Katzung, 14th ed. pg. 957; KDT, 6th ed. pg. 823

- *The toxicity of Mtx can not be overcome by folic acid, because it will not be converted to the active coenzyme form.however folinic acid rapidly reverses the effect.*
- *Thymidine also counteracts the Mtx toxicity.*
- *Refer to above explanation.*

335. Ans. (d) Methotrexate

Ref: Katzung, 14th ed. pg. 955, 957; KDT, 6th ed. pg. 823

- **Methotrexate** is an antimetabolite which act by inhibiting Dihydro folate Reductase.
- It is DOC for Choriocarcinoma, and is also considered among the first line drugs in Breast CA, testicular tumors, cervix CA and osteogenic sarcoma.
- Mtx is NOT indicated in MM.
- **Melphalan** is very effective in multiple myeloma and has been used in advanced ovarian cancer.
- First line drugs of multiple myeloma: Melphalan, Prednisolone, Cyclophosphamide.
- **Thalidomide** was used previously for morning sickness but later withdrawn due to severe teratogenic effects (phocomelia).
- It has been re-introduced due to its immunomodulatory and anti-cancer properties. It has been approved for multiple myeloma and erythema nodosum leprosum and is being tried for myelodysplastic syndrome, melanoma, Bechet disease, HIV associated ulcers and graft versus host disease.
- **Zolendronic acid:** It is a *bisphosphonate* indicated for the treatment of bony metastases and multiple myeloma.

336. Ans. (c) Cisplatin

Ref: Katzung, 14th ed. pg. 956; KDT, 6th ed. pg. 828

- **Cisplatin** is a platinum coordination complex that is hydrolyzed intracellularly to produce a highly reactive moiety which causes cross linking of DNA by platinum compound.
- It is a highly emetic drug. Antiemetics are routinely administered before infusing cisplatin.
- **DOC for cisplatin induced vomiting**: Ondansetron
- **Major s/e of cispltin:** Ototoxicity and nephrotoxicity.

337. Ans. (c) Cisplatin

Ref: Katzung 14th ed. pg. 956, 957

- **Cisplatin** is a widely used anti cancer drug.
- It has major antitumor activity in a broad range of solid tumors including
  - Non-small cell and small cell lung cancer
  - Esophageal and gastric cancer
  - Head and neck cancer and
  - Genitourinary cancers, particularly testicular, ovarian, and bladder cancer.
- When used in combination regimens with vinblastine and bleomycin or etoposide and bleomycin, cisplatin-based therapy has led to the cure of nonseminomatous testicular cancer.

Extra Mile

5-FU is a pyrimidine analogue used in colorectal cancer.
Methotrexate is considered as DOC for choriocarcinoma.

338. Ans. (a) 6-mercaptopurine

Ref: Katzung, 14th ed. pg. 960–61; KDT, 6th ed. pg. 820

- 6 mercaptopurine (6-MP) is a purine analogue which is metabolized by xanthine oxidase
- It is a competitive inhibitor of DNA.
- Allopurinol is NOT given along with 6-MP because allopurinol inhibits xanthine oxidase enzyme, which leads to increased toxicity due to accumulation of xanthine.

Anti-neoplastic drugs	Their side effect
Cyclophosphamide, ifosphamide	Hemorrhagic cystitis
Procarbazine	Disulfiram like reaction
Bleomycin, busulfan	Pulmonary fibrosis
Vincristine, vinblastine	Peripheral neuropathy
Cisplatin	Ototoxicity, Nephrotoxicity
6Mercaptopurine, 6Thioguanine	Hepatotoxicity
Doxorubicin, Daunorubicin	Cardiotoxic

- In addition, it can also be utilized in osteoporosis management and prophylaxis due to its agonistic activity over bone where it increases the osteoblastic activity.
- Due to its agonistic activity in liver, it can increase the lipid metabolism, hence it can reduce the LDL activity.

346. Ans. (d) IV Mannitol

Ref: Goodman and Gillman 13th ed. pg. 452-53

- IV Mannitol is an osmotic diuretic. It can be used in treatment of glaucoma, cerebral edema, dialysis disequilibrium syndrome
- **Drugs used in hypertensive emergency:**
  - Nicardipine- DOC
  - Clevidipine, Clinidipine
  - Hydralazine
  - Labetalol, Esmolol
  - Na^+ Nitroprusside
  - Fenoldopam

347. Ans. (b) Lisinopril

Ref: Goodman and Gillman 13th ed. pg. 483

- In a patient with chronic congestive heart failure, cardiac

Question 51

A patient with palpitations and high blood pressure 220/110. there was one episode of seizure also. Which of the following is preferred agent:

(FMGE JULY 2024)

a. Oral Nifedipine
b. IV Labetalol
c. Oral Prazosin
d. IV Nitroglycerine

348. Ans. (a) Alpha methyl dopa

- Among the given choices, drug which is preferred for pregnancy induced hypertension is Alpha Methyl dopa.
- **Note:**
  - DOC for hypertension in pregnancy: Labetalol
  - DOC for hypertensive emergency in pregnancy: Labetalol
  - **Anti-hypertensives safer in pregnancy:***(Mn: Lady Hardinge Medical College)*
    - Labetalol
    - Hydralazine
    - Alpha methyldopa, Clonidine
    - CCB's (DHP's- Ex: Amlodipine)
    - Cardio selective beta blockers
  - **Anti-Hypertensives contraindicated in pregnancy:** *(Mn: Avoid DNB)*
    - ACE inhibitors (- PRILS), ARBs (- SARTAN)
    - Diuretics
    - Na+ Nitroprusside, Non-DHP's (Verapamil)
    - Beta blockers (Non-Selective)

349. Ans. (a) Lisinopril

- Lisinopril is an ACE inhibitor, which increases level of Bradykinin level
- Increased bradykinin is known to cause dry cough and angioedema like symptoms.

Side effects of ACE inhibitors:

- Angioedema
- Dry Cough
- Elevated K+
- Orthostatic hypotension
- Cholestatic hepatotoxicity
- Dysgusea

350. Ans. (a) Spironolactone

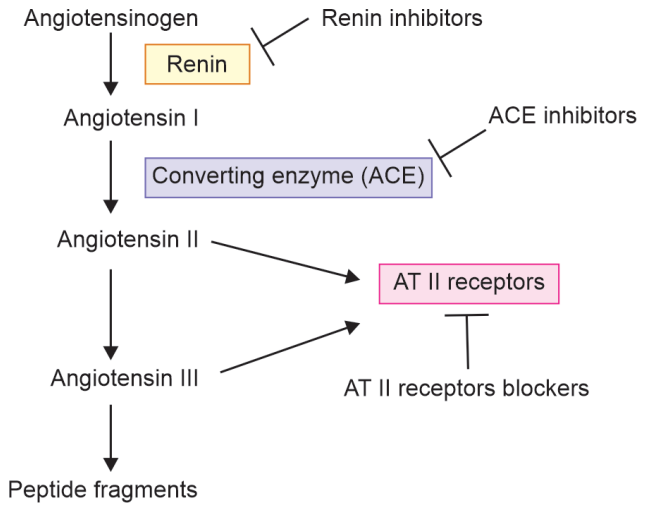
- Spironolactone is an aldosterone receptor antagonist, which is utilized in resistant hypertension and chronic CHF.
- Its metabolite Canrenone, 7 alpha spirolactone, is a known androgen receptor antagonist, which causes gynecomastia, decreased libido.

351. Ans. (b) Lidocaine

- Lidocaine is DOC for treatment of digoxin induced ventricular arrhythmia.
- It is a class Ib anti arrhythmic drug.
- Atropine is used for bradyarrhythmia. It can also be used.
- Amiodarone should be avoided in digoxin induced arrhythmia as amiodarone can increase the plasma level of Digoxin and precipitates digoxin toxicity.

352. Ans. (d) Indirectly increases renin level

Ref: Goodman Gillman 13th ed. pg. 486



Question 52

Mechanism of action of Ethosuximide:

(FMGE JULY 2024)

a. VG-Na+ channel blocker
b. GABA receptor activator
c. T-type Ca+ channel blocker
d.

Question 53

diabetic patient fainted suddenly while exercising, blood sugar was 60gm/dl. which of the following anti diabetic drug is possible cause:

(FMGE JULY 2024)

a. Sulfonylurea
b. Metformin
c. Acarbosea+ channel blocker
d.

374. Ans. (d) All of these

Ref: KDT 6th ed. pg. 528

TABLE: Types of calcium channel blocker

	L-Type (long lasting current)	T-Type (transient current)	N-Type (neuronal)
Locations and function	Excitation–contraction coupling in cardiac and smooth muscle SA, A-V node: Conductivity Endocrine cell: Hormone release Neurons: transmitter release	Sa node-pacemaker activity "T" current and repetitive spikes in thalamic and other neurons Endocrine cells hormone release Certain arteries constriction	Only on Neurons in CNS, sympathetic and myenteric plexuses transmitter release
Blocker (drugs)	**DHP's:** Amlodipines, Nifedipine **Non- DHP:** Diltiazem, verapamil	Mibefradil, flunarizine, ethosuximide Trimethadione	ω- conotoxin

375. Ans. (a) Hydrochlorthiazide

Ref: KDT, 6th. pg. 274

Drugs causing glucose intolerance (hyperglycemia)		
Glucocorticoids	Diazoxide	Clozapine
Thiazides		β adrenergic agonist
Phenytoin	Protease inhibitors	Thyroid hormone
Pentamidine	β-IFN	Nicotinic acid

Note:

- Sulfonylureas are oral hypoglycemic agents. They cause hypoglycemia.
- ACE inhibitors also cause hypoglycemia.
- Other agents causing hypoglycemia: Quinine, Pentamidine, Octreotide, Insulin.

376. Ans. (a) Losartan

Ref: KDT, 6th ed. pg. 488

- Losartan has a uricosuric effect in hypertensive patients, and causes a decrease in serum uric acid levels by 20% to 25%.
- Losartan acts by inhibiting the urate/lactate exchanger and urate/chloride exchanger in the proximal convoluted tubule and leads to uricosuria.
- Allopurinol reduces approximately 30% decrease in serum uric acid, resulting from the ability of allopurinol to inhibit xanthine oxidase, the enzyme responsible for the oxidation of purine to uric acid.

377. Ans. (b) Losartan

Ref: KDT, 6th ed. pg. 488

ANGIOTENSIN RECEPTOR BLOCKERS

- These are orally active AT 1 receptor antagonists which include **losartan, candesartan, valsartan, telmisartan and irbesartan.**
- **Losartan** is a competitive antagonist and inverse agonist of A-II, 10,000 times more selective for AT1 than AT2 receptor.
- It does not block any other receptor or ion channel, EXCEPT **Thromboxane A2 receptor**, which is responsible for its platelet anti-aggregatory property attenuation.

Extra Mile

- Telmisartan has PPAR-Y agonist action which can increase sensitivity to insulin. Therefore preferred in diabetics.

378. Ans. (c) CCB and β blockers

Ref: KDT, 6th ed. pg. 553

- Verapamil or diltiazem (CCB's) with β blockers are avoided because they may cause marked bradycardia and A-V block.
- Nitrates are used in conditions like CHF, Angina pectoris, MI, and Diffuse esophageal spasm. It can be given in combination with CCBs or β blockers.

Other antihypertensive combinations to be avoided:

- An α or β adrenergic blocker with clonidine: An apparent antagonism of clonidine action has been observed.
- **Nifedipine with diuretic:** Synergism between these two is still unproven.
- Methydopa with clonidine or any two drugs of same class.
- ACE inhibitor with ARB

Extra Mile

Most common side effect of insulin: Hypoglycemia
DOC for Diabetic ketoacidosis (DKA): Regular insulin

403. Ans. (a) Insulin lispro

Ref: KDT 6th ed. pg. 259

Please refer to above explanation.

404. Ans. (a) Insulin aspart

- Ultrashort acting insulins are the fastest acting ones.
- Onset of action within 15–30 minutes and duration of action is 3–5 hours.

405. Ans. (c) Dopamine stimulate prolactin production

Ref: KDT, 6th ed. pg. 235-236

- Prolactin is produced from anterior pituitary and is associated with lactation.
- Prolactin is under predominant inhibitory control of hypothalamus through PRIH (Prolactin Release Inhibitory Hormone), which is Dopamine that acts on pituitary lactotrope D2 receptor.
- Dopaminergic agonist like bromocriptine, DA, cabergoline decrease plasma prolactin levels and is used to treat hyperprolactinemia
- Dopaminergic antagonists like chlorpromazine haloperidol, metoclopramide causes hyperprolactinemia by blocking D2 receptors.
- A progressive increase in prolactin occurs during pregnancy, peaking at term. After childbirth, this dopamine is inhibited and prolactin now stimulates milk production.

Extra Mile

Milk production is stimulated by: Prolactin (remember production by prolactin).
Milk secretion is stimulated by: Oxytocin
DOC for hyperprolactinemia: Bromocriptine

406. Ans. (c) Dopamine

Ref: KDT, 6th ed. pg. 235-236

- Prolactin is under predominant inhibitory control of hypothalamus through PRIH (Prolactin Release Inhibitory Hormone), which is **Dopamine** that acts on pituitary lactotrope D2 receptor.
- A progressive increase in prolactin occurs during pregnancy, peaking at term. After childbirth, this dopamine is inhibited and prolactin now stimulates milk production.

Question 54

A diabetic patient fainted suddenly while exercising, blood sugar was 60gm/dl. which of the following anti diabetic drug is possible cause:

(FMGE JULY 2024)

a. Sulfonylurea
b. Metformin
c. Acarbose
d.

408. Ans. (a) Metformin

Ref: KDT, 6th ed. pg. 267

METFORMIN

- Metformin is an antidiabetic drug from biguanides category.
- They improve lipid profile, hence considered as DOC for DM in obese patients.
- **MOA:**
  - Increase peripheral utilization of glucose
  - Inhibit hepatic gluconeogenesis
- Metformin never causes hypoglycemia.
- Recent report says, metformin is weight neutral drug.
- Another drug from Biguanides is *Phenformin*, which is withdrawn, because it causes lactic acidosis.
- **Sulfonylureas** causes a brisk release of insulin from pancreas which stimulate the functional receptors for the intake of glucose. They cause weight gain
  - They can cause hypoglycemia.
  - Preferred in thin patients with DM
- **Repaglinide** has same MOA as sulfonylureas, but it is short acting.
  - Used to control sudden rise of glucose after meal.
- **Acarbose** act by inhibiting G.I. absorption of sugar.
  - **s/e:** Can cause osmotic diarrhea.

Extra Mile

- Safest sulfonylureas: Tolbutamide (safer in elderly also)

*Remembered as: **MOST**- Metformin for Obese; Sulfonylureas for Thin.*

409. Ans. (c) Monitoring of liver enymes is recommended

Ref: KDT, 6th ed. pg. 304-5

- Tamoxifen is a SERM that acts as antagonist at estrogen receptors in the breast. It decreases the risk of contralateral breast cancer and is approved for primary prevention of breast cancer in women at high risk.

GIT

465. Ans. (a) Loperamide

Ref: Goodman and Gillman 13th ed. pg. 931-32

- The given case is a patient of Traveler's diarrhea.
- Loperamide is an opioid, which reduces the intestinal motility and it remains the antimotility agent of choice for traveler's diarrhea.
- In addition to its anti-peristaltic effect, it has also been shown to increase the intestinal absorption of fluid and electrolytes.
- When used as sole therapy, loperamide provides relief for mild to moderate diarrhea (up to five loose stools per day with or without mild cramping pain), in comparison to either a placebo or bismuth subsalicylate.

Extra Mile

- Rifaximin is an agent used in irritable bowel syndrome
- Octreotide can be used in secretary diarrhea
- Zinc is a supplemental/add-on drug given in infective diarrhea and secretary diarrhea along with other drugs.

466. Ans. (c) Palonosetron

- DOC for chemo induced nausea and vomiting: 5HT3 antagonist (Ondansetron, Granisetron).
- DOC for chemo induced delayed vomiting: NK1 antagonist: Aprepitant, Rolapitant, Netupitant

467. Ans. (a) Lactulose

Ref: Goodman & Gillman 13th ed. pg. 928, 940

USES OF LACTULOSE

- Constipation caused by opioids
- Idiopathic chronic constipation
- Lactulose also used to treat hepatic encephalopathy

LACTULOSE IN HEPATIC ENCEPHALOPATHY

- Impaired liver function/severe liver disease are unable to detoxify the ammonia coming from colon which is produced by colonic bacterial metabolism of fecal urea.
- The drop in luminal pH that accompanies hydrolysis to short-chain fatty acids in the colon results in "trapping" of the ammonia by its conversion to the polar ammonium ion.
- Combined with the increase in colonic transit, this therapy significantly lowers circulating ammonia levels. The therapeutic goal in this condition is to give sufficient amounts of lactulose (usually 20–30 g three to four times per day) to produce two to three soft stools a day with a pH of 5–5.5.

468. Ans. (a) Antacid

Ref: Katzung's, 14th ed. pg. 1089

- This medication is used to treat symptoms caused by too much stomach acid such as heartburn, upset stomach, or indigestion.
- It is an antacid that works by lowering the amount of acid in the stomach.
- It can also be used in renal osteodystrophy with hyperphosphatemia, hypocalcemia and osteoporosis like conditions.
- It can cause metabolic alkalosis (Milk-alkali syndrome)

469. Ans. (c) Proton pump inhibitors like Omeprazole

Ref: KDT, 6th ed. pg. 632

- Proton pump inhibitors (PPIs) are the drugs of choice for peptic ulcer disease (PUD) due to any etiology (even NSAID induced).
- PPIs are also the agents of choice for gastroesophageal reflux disease (GERD) and Zollinger Ellison Syndrome (ZES).
- **Misoprosotol:** Specific agent for NSAID induced ulcer.

470. Ans. (c) Hyoscine

Ref: KD Tripathi, 6th ed. pg. 641, 642, 644, 646

HYOSINE

- It is the most effective drug for motion sickness.
- Suitable only for short brisk journies.
- It act by blocking conduction of nerve impulses in the pathway leading from the vestibular apparatus to the vomiting centre and is *not effective in vomiting of other etiologies.*

ONDANSETRON

- It is considered as the drug of choice for drug induced vomiting.
- Used mainly to control cancer chemotherapy induced vomiting.
- Effective in postoperative nausea and vomiting as well.

METOCLOPRAMIDE

- It is an effective and popular drug for many types of vomiting like: Postoperative, drug induced, disease associated (especially migraine), radiation sickness, etc.

CHLORPROMAZINE

- These are from typical antipsychotic having potent antiemetic action; act by blocking D2 receptors in the CTZ.

Question 55

Which of the following is MOA of Rivaroxaban:

(FMGE JULY 2024)

a. Direct Xa inhibitor
b. Direct lla inhibitor
c. Vitamin K dependent clotting factor inhibitor
d.

485. Ans. (a) Apixaban

Ref: Goodman & Gillman 13th ed. pg. 595

- Factor Xa inhibition results in reduced thrombin generation → suppression of platelet generation and fibrin formation.
- Factor Xa inhibitor drugs are: Rivaroxaban, Apixaban, Edoxaban
- Dose of apixaban: 5 mg BD
- **Use:**
  - Stroke prevention in patients with atrial fibrillation
  - Deep vein thrombosis, Pulmonary embolism
  - Postoperative thromboprophylaxis is patients undergoing hip/knee surgery
- Contraindicated for stroke prevention in patients with mechanical heart valve
- **Side effects:**
  - **Bleeding**- MC side effect. Incidence 50% lesser than warfarin induced bleeding except GI bleed.
    - (GI bleed: Apixaban, Rivaroxaban > Warfarin)
- **Antidote:** Andexanet Alfa, Ciraparantag

486. Ans. (b) Filgrastim

Ref: Goodman & Gillman 13th ed. pg. 756

- Filgrastim is G-CSF (Granulocyte Colony Stimulating Factor)
- The principal action of filgrastim is the stimulation of CFU-G to increase neutrophil production
- Forms of G-CSF are now available, including two longer-acting pegylated forms, pegfilgrastim and lipegfilgrastim.
- **Use:**
  - Severe neutropenia after autologous hematopoietic stem cell transplantation
  - Neutropenia after high dose cancer chemotherapy
  - Congenital neutropenia
  - Neutropenia of any other cause
- **Dose:** 1–20 µg/kg/day via IV or subcutaneous route
- **Side effect:** Mild-to-moderate bone pain

487. Ans. (b) Deferoxamine

Ref: Goodman & Gillman's 13th ed. pg. 63, 1314

- Iron chelating agent is: Deferoxamine

TABLE: Antidotes of different poisoning

Poisoning indication(s)	Antidote
Acetaminophen	Acetylcysteine
Organophosphorus and carbamate pesticides	Atropine sulfate
Drug-induced dystonia	Benztropine
Na^+ channel blocking drugs	Bicarbonate, sodium
Neuroleptic malignant syndrome	Dantrolene
Ca^{2+} channel blocking drugs, fluoride	Calcium gluconate or chloride
Valproate hyperammonemia	Carnitine
Malignant hyperthermia	Dantrolene
Iron	Deferoxamine
Cardiac glycosides	Digoxin immune Fab
Drug-induced dystonia	Diphenhydramine
Lead, mercury, arsenic	Dimercaprol (BAL)
Lead	EDTA, $CaNa_2$
Methanol, ethylene glycol	Fomepizole/Ethanol
Benzodiazepines	Flumazenil
β adrenergic antagonists	Glucagon hydrochloride
Cyanide	Hydroxocobalamin hydrochloride
Hyperkalemia	Insulin (High dose)
Methotrexate	Leucovorin calcium
Methemoglobinemia	Methylene blue
Opioids	Naloxone hydrochloride
Sulfonylurea-induced hypoglycemia	Octreotide acetate
Carbon monoxide	Oxygen, hyperbaric
Copper	D-Penicillamine
Anticholinergic syndrome	Physostigmine salicylate
Isoniazid seizures	Pyridoxine hydrochloride
Coumarin, indanedione	Vitamin K_1 (Phytonadione)

488. Ans. (b) Vitamin K antagonist

Ref: KD Tripathi, 7th ed. pg. 620, 621

- Warfarin and its congeners act as anticoagulants only in vivo (body), NOT in vitro (lab).
- It acts by inhibiting Vitamin K. Due to overdose, hematuria is the *first manifestation* noted.
- Dose monitoring is done by INR
- Antidote of warfarin overdose: Vitamin K

- **Akathisia** is an extra pyramidal symptom that arises mainly due to intake of typical anti psychotics like haloperidol, fluphenazine etc.
- It is characterized by restlessness, feeling of discomfort and constant purposeless involuntary movement from one place to another without any source of anxiety.
- **Akathisia is the *most common* extra pyramidal symptom.**
- DOC for akathisia: **PROPANOLOL.**

176. Ans. (b) Clozapine

Ref: KDT 8th ed. pg. 467

- Among given option Clozapine is the only atypical antipsychotics. As discussed earlier, atypical antipsychtics has less risk of EPS development as compared to typical antipsychotics.
- Overall least risk of EPS among atypicals is: Clozapine

177. Ans. (a) Aripiprazole

Ref: KDT 8th ed. pg. 467

- Among given choice, least risk of EPS among atypicals is: ARIPIPRAZOLE. (Atypical has less EPS risk)
- Typicals always has high EPS.

178. Ans. (d) Quetipaine

- Antipsychotic which is associated with lenticular opacity/Cataract: **Quetiapine**
- Antipsychotic associated with corneal opacity: **Chlorpromazie and Thioridazine**

179. Ans. (a) Risperidone

Ref: KDT, 8th ed. pg. 469

- Atypicals with maximum risk of hyperprolactinemia is: Risperidone
- Most potent atypical antipsychotic: Risperidone
- Atypicals with least risk of EPS: Clozapine
- Atypicals that can cause cardiac arrhythmias: Sertindole, Zotepine
- **Atypicals with maximum risk of obesity: Clozapine, Olanzapine**

180. Ans. (d) Haloperidol

Ref: KDT, 8th ed. pg. 471

Haloperidol is from typical antipsychotic class that is commonly associated with extrapyramidal symptoms like neuroleptic malignant syndrome.

181. Ans. (b) Diazepam

Ref: Katzung's, 11th ed. pg. 462-63

- Anxiety occurvs as a result of mild CNS stimulation which may occur secondary to reduction in GABAergic activity or increase in serotonin activity.
- Therefore, a drug which is used for anxiety is CNS

Question 56

Which of the following is a NMDA blocker:

(FMGE JULY 2024)

a. Ketamine
b.
c.
d.

182. Ans. (b) Ketamine

Ref: Katzung, 11th ed. pg. 437; KDT, 6th ed. pg. 376

- Ketamine is the only intravenous anesthetic that possesses analgesic properties and produces cardiovascular stimulation.
- It causes ***"dissociative anesthesia"*** which is characterized by profound analgesia, immobility, amnesia and feeling of dissociation from one's own body and the surrounding.
- It has bronchodilator effect therefore considered as Induction agent of choice in asthma patient.
- **In addition it also causes:**
  - Hallucination
  - Delusion and illusion
  - Profound analgesia
- **Ketamine increases all pressures like:**
  - BP (hypertension), Heart rate, Cardiac output
  - Intracranial tension (it increases cerebral blood flow)
  - Intraocular pressure (IOP)
- It is contraindicated in intracerebral mass/haemorrhage, MI, schizophrenia, Epilepsy

MOA of Ketamine:

- It acts by blocking NMDA receptor (of glutamate).

Extra Mile

Side effect of other given options:

- **Propofol:** Apnea, Decreases BP and HR
- **Thiopentone:** Laryngospasm, Shivering & Delirium
- **Etomidate:** Adrenocortical suppression

183. Ans. (b) It is GABA facilitator

Ref: KDT, 7th ed. 402, Katzung, 11th ed. pg. 377

- GABA is an inhibitory neurotransmitter.
- Benzodiazepine helps GABA to open the chloride channel. Once Chloride enters, negativity in the neuron increases (hyperpolarized), which leads to depressed neuron.
- It is barbiturate which is GABA mimetic.

Question 57

A patient on metronidazole therapy 3 times per day attended a party on weekend and consumed alcohol. He developed nausea, vomiting, palpitations, flushing episode and headache. What is the possible diagnosis:

(FMGE JULY 2024)

a. Disulfiram like reaction
b. Delirium tremens
c. Drug intoxication
d. Alcohol intoxication

- Therefore, it is recommended only for those alcoholics who are motivated and sincerely desire to leave the habit.
- **Drugs causing disulfiram like reaction:**
  - Griseofulvin
  - Moxalactam
  - Metronidazole
  - Chlorpropamide
  - Cefoperazone
  - Cefotetan
  - Trimethorprim
  - Procarbazine

- **Other drugs that decrease craving for alcohol and smoking: (*remembered as NATO*)**
  - NALTREXONE
  - ACAMPROSATE
  - TOPIRAMATE
  - ONDANSETRON

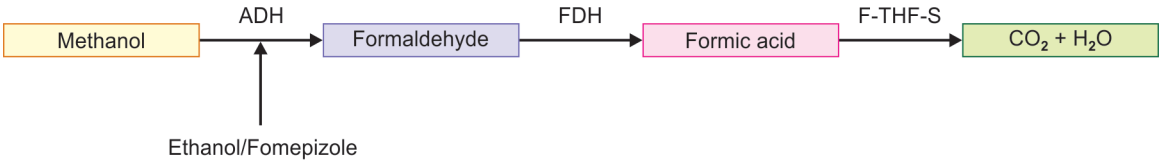
Extra Mile

- Drug which inhibits alcohol dehydrogenase- **FOMEPIZOLE**
- Antidote for methanol poisoning: **FOMEPIZOLE > ETHANOL**
- Antidote for ethylene glycol poisoning: **FOMEPIZOLE**

217. Ans. (a) Competitively inhibits alcohol dehydrogenase

Ref: Katzung, 14th ed. pg. 404; KDT, 6th ed. pg. 387

- **Ethanol** acts by competitive inhibition of alcohol dehydrogenase which block further metabolism of methanol into formaldehyde and formic acid. These products also cause retinal damage leading to subsequent blindness.



ADH: alcohol dehydrogenase: FDH : formaldehyde dehydrogenase
F-THF-S: 10-formyl tetrahydrofolate synthetase

- **Catalase** is a common enzyme found in nearly all living organisms exposed to oxygen. It catalyzes the decomposition of hydrogen peroxide to water and oxygen
- **Lactate dehydrogenase:** Dummy choice and is present in heart, RBC and is used as marker for malignancy.
- **Acetaldehyde dehydrogenase:** Converts acetaldehyde into acetic acid and is the target for disulfiram which is used to help patients quit alcohol.

Remember

- **Ethanol** is also metabolized by alcohol dehydrogenase and acts as its competitive inhibition. The enzyme's affinity for ethanol is 10-20 times higher than it is for methanol. Given via IV infusion in methanol or ethylene glycol poisoning.
- **Fomepizole** inhibits alcohol dehydrogenase. It is a stronger competitive inhibitor of ADH and, in addition, does not cause hypoglycemia or sedation.
- **Fomepizole** is relatively easier to administer than ethanol. It does not require monitoring of serum concentrations. Hence considered **as drug of choice**.

218. Ans. (d) Flumazenil

Ref: Katzung, 14th ed. pg. 404; KDT, 6th ed. pg. 385

- **Flumazenil is benzodiazepine antagonist. It has no role in alcohol detoxification.**

Alcohol Detoxification

Alcohol can produce physical and psychological dependence. In the treatment of alcohol dependence, major aim is to prevent withdrawal symptoms first and to avoid relapse of addiction thereafter.

- **Benzodiazepines** (chlordiazepoxide and diazepam) are long acting CNS depressant and are given to **prevent withdrawal.**
- **Acamprosate** is an **NMDA antagonist** that can be used for **maintenance therapy of alcohol abstinence.**
- **Naltrexone** is an opioid antagonist that can be used to reduce **alcohol craving.**
- **Disulfiram** can be used in psychologically dependent persons who are motivated to quit alcohol. It is ***contraindicated in physically dependent*** individuals. It produces severe distressing symptoms (like flushing, headache, vomiting, visual disturbances and mental confusion) after intake of alcohol due to accumulation of acetaldehyde.
- **Topiramate and ondansetron** can also *decrease* alcohol craving.

219. Ans. (c) Metoclopramide

Ref: KDT, 6th ed. pg. 643

Question 58

Which of the following agent is used in treatment of HIV and Hepatitis B both:

(FMGE JULY 2024)

a. s. Tenofovir
b. b. Dolutegravir
c.
d.

- Tenofovir (option C) is a nucleotide reverse transcriptase inhibitor. It is used in HIV and HBV infection
- Mupirocin (option D): Is used topically for strep pyogens, staph aureus and MRSA nasal carriers.

228. Ans. (a) Chloroquine

Ref: Katzung 14th ed. pg. 918-19

Question 59

A patient on metronidazole therapy 3 times per day attended a party on weekend and consumed alcohol. He developed nausea, vomiting, palpitations, flushing episode and headache. What is the possible diagnosis:

(FMGE JULY 2024)

a. Disulfiram like reaction
b. Delirium tremens
c. Drug intoxication
d. Alcohol intoxication

229. Ans. (a) Metronidazole

Ref: Katzung 14th ed. pg. 895-96, 1166

- The given case shows feature of disulfiram like reactions.
- **Drugs causing disulfiram like reaction:**
  - Griseofulvin
  - Metronidazole
  - Cefotetan, Cefoperazone, Cefamandole
  - Moxalactam
  - Procarbazine
  - Chlorpropamide

230. Ans. (d) Amoxicillin

Ref: KDT 8th ed. pg. 1018

Class of Drugs contraindicated in pregnancy and its safer alternative

Class of drug	Contraindicated	Safer alternative
Antibacterials (systemic bacterial infections)	Cotrimoxazole, Fluoroquinolones (X), Tetracycline (X), Doxycycline (X), Chloramphenicol (X) Gentamicin, Streptomycin (X) Kanamycin (X), Tobramycin (X), Clarithromycin, Azithromycin Clindamycin, Vancomycin Nitrofurantoin	Penicillin G, Ampicillin Amoxicillin-clavulanate Cloxacillin, Piperacillin Cephalosporins Erythromycin

Extra Mile

- Sulfonamides (Co-Trimoxazole) if used during pregnancy can lead to kernicterus.
- Aminoglycosides (Gentamicin): Can produce ototoxicity and nephrotoxicity
- Floroquinolones (Ciprofloxacin): Affects growing cartilage and tendon

231. Ans. (c) Schistosomiasis

Ref: Katzung 14th ed. pg. 939

- Drug of choice for all the **flukes** (**trematodes**) is **Praziquantel** except liver fluke, where drug of choice is Triclabendazole or Bithionol.
- Drug of choice for all the **tapeworms** (**cestodes**) is **Praziquantel** except Cysticercosis and Echinococcus where drug of choice is Albendazole.
- Drug of choice for all the **Roundworms (Nematode)** is Albendazole/Mebendazole except Strongyloides, Onchocerca (DOC: Ivermectin) and Filariasis, loa-loa disease (DOC is Diethylcarbamazine).

TABLE: Drugs for the treatment of helminthic infections

Infection organism	Drug of choice	Alternative drugs
Roundworms (nematodes)		
Ascaris lumbricoides (roundworm)	Albendazole or pyrantel pamoate or mebendazole	Ivermectin, piperazine
Trichuris trichiura (whipworm)	Mebendazole or albendazole	Ivermectin, oxantel pamoate drug combinations
Necator americanus (hookworm); *Ancylostoma duodenale* (hookworm)	Albendazole or mebendazole or pyrantel pamoate	
Strongyloides stercoralis (threadworm)	Ivermectin	Albendazole or thiabendazole
Enterobius vermicularis (pinworm)	Mebendazole or pyrantel pamoate	Albendazole
Trichinella spiralis (trichinosis)	Mebendazole or albendazole; add corticosteroids for severe infection	

Contd...

Question 60

Preferred drug for plasmodium falciparum:

(FMGE JULY 2024)

a. Artemisinin combination therapy
b. Oral chloroquine
c. Primaquine
d. Quinine

267. Ans. (d) Pyrimethamine

Ref: KDT, 6th ed. pg. 783

- *The drugs which are erythrocytic schizontocides are used to terminate an episode of malarial fever. They can be divided into:*

Fast-acting high-efficacy drugs	Slow-acting high-efficacy drugs
Chloroquine, amodiaquine, quinine, mefloquine, halofantrine, lumefantrine, atovaquone, artemisinin.	*Pronguanil.* **Pyrimethamine**, *sulfonamides, tetracyclines*
They can be used singly to treat attacks of malarial fever	They are used only in combination for clinical cure

Extra Mile

- DOC for malaria: **Chloroquine** (safe in pregnancy)
- DOC for cerebral malaria: **Artesunate**
- DOC for chloroquine resistant malaria: **ACT**- *artemisinin combination therapy* (artisunate+pyrimethamine + sulfadoxine)
- Fastest acting anti-malarial: **Artimisinin**.
- Safest anti-malarial: **Proguanil**
- Short term prophylaxis of malaria (<6 weeks): **Doxycycline** 100 mg OD (start 2 days before)
- Long term prophylaxis of malaria (>6 weeks): **Mefloquine** 250 mg weekly (start a week before)

268. Ans. (a) Praziquantel

Ref: Katzung, 14th ed. pg. 944; Harrison, 17th ed. pg. 1334

- **Schistosomiasis is a type of infection caused by helminth subtypes that live in fresh water, such as rivers or lakes, in subtropical and tropical regions.**
- Schistosomiasis is also known as bilharzia.
- Symptoms can develop a few weeks after someone is infected by the parasite and include flu-like symptoms, such as a high temperature (fever) above 38°C (100.4°F) and muscle aches, skin rash, cough or urinary symptoms (cystitis, hematuria)

Anti-Helminthic agents

Helminthes	Name	Drug of choice
NEMATODE	Round worm (Ascaris) Pinworm (enterobius vermicularis) Hookworm (N. Americanus, A. duodenale) Whip worm (trichuris trichura) Trichinea worm (trichinella spiralis) Guinea worm (Dracunculus medinensis)	ALBENDAZOLE/MEBENDAZOLE
	Filarial worm (W. Bancrofti, B. Malayi)	DEC/Ivermectin
	Onchocerca volvulus Threadworms (strongyloides stercoralis)	Ivermectin
TREMATODE	Blood fluke (schistosoma japonicum, mansoni & Hematobium) Lung fluke (paragonimus westermani) Liver fluke (fasciola Heaptica) → *DOC:* ***Triclabendazole/Bithionol***	**PRAZIQUANTEL** EXCEPT for fasciola Hepatica (Triclabendazole)
CESTODE	Pork tapeworm (taenia solium) Beef tapeworm (taenia saginata) Fish tapeworm (Diphyllobothrium latum) Dog tapeworm (Echinococcus granulosus) Dwarf tapeworm (Hymenolepis Nana)	**PRAZIQUANTEL/ NICLOSAMIDE**

METRONIDAZOLE is DOC for: Trichomoniasis, Giardiasis, Bacterial vaginosis, Amoebic liver disease, Hydatid disease, Cysticercosis

Question 61

Mechanism of action of Ethosuximide:

(FMGE JULY 2024)

a. VG-Na+ channel blocker
b. GABA receptor activator
c. T-type Ca+ channel blocker
d.

Question 62

diabetic patient fainted suddenly while exercising, blood sugar was 60gm/dl. which of the following anti diabetic drug is possible cause:

(FMGE JULY 2024)

a. Sulfonylurea
b. Metformin
c. Acarbose
d.

374. Ans. (d) All of these

Ref: KDT 6th ed. pg. 528

TABLE: Types of calcium channel blocker

	L-Type (long lasting current)	T-Type (transient current)	N-Type (neuronal)
Locations and function	Excitation–contraction coupling in cardiac and smooth muscle SA, A-V node: Conductivity Endocrine cell: Hormone release Neurons: transmitter release	Sa node-pacemaker activity "T" current and repetitive spikes in thalamic and other neurons Endocrine cells hormone release Certain arteries constriction	Only on Neurons in CNS, sympathetic and myenteric plexuses transmitter release
Blocker (drugs)	**DHP's:** Amlodipines, Nifedipine **Non- DHP:** Diltiazem, verapamil	Mibefradil, flunarizine, ethosuximide Trimethadione	ω- conotoxin

375. Ans. (a) Hydrochlorthiazide

Ref: KDT, 6th. pg. 274

Drugs causing glucose intolerance (hyperglycemia)		
Glucocorticoids	Diazoxide	Clozapine
Thiazides		β adrenergic agonist
Phenytoin	Protease inhibitors	Thyroid hormone
Pentamidine	β-IFN	Nicotinic acid

Note:

- Sulfonylureas are oral hypoglycemic agents. They cause hypoglycemia.
- ACE inhibitors also cause hypoglycemia.
- Other agents causing hypoglycemia: Quinine, Pentamidine, Octreotide, Insulin.

376. Ans. (a) Losartan

Ref: KDT, 6th ed. pg. 488

- Losartan has a uricosuric effect in hypertensive patients, and causes a decrease in serum uric acid levels by 20% to 25%.
- Losartan acts by inhibiting the urate/lactate exchanger and urate/chloride exchanger in the proximal convoluted tubule and leads to uricosuria.
- Allopurinol reduces approximately 30% decrease in serum uric acid, resulting from the ability of allopurinol to inhibit xanthine oxidase, the enzyme responsible for the oxidation of purine to uric acid.

377. Ans. (b) Losartan

Ref: KDT, 6th ed. pg. 488

ANGIOTENSIN RECEPTOR BLOCKERS

- These are orally active AT 1 receptor antagonists which include **losartan, candesartan, valsartan, telmisartan and irbesartan.**
- **Losartan** is a competitive antagonist and inverse agonist of A-II, 10,000 times more selective for AT1 than AT2 receptor.
- It does not block any other receptor or ion channel, EXCEPT **Thromboxane A2 receptor**, which is responsible for its platelet anti-aggregatory property attenuation.

Extra Mile

- Telmisartan has PPAR-Y agonist action which can increase sensitivity to insulin. Therefore preferred in diabetics.

378. Ans. (c) CCB and β blockers

Ref: KDT, 6th ed. pg. 553

- Verapamil or diltiazem (CCB's) with β blockers are avoided because they may cause marked bradycardia and A-V block.
- Nitrates are used in conditions like CHF, Angina pectoris, MI, and Diffuse esophageal spasm. It can be given in combination with CCBs or β blockers.

Other antihypertensive combinations to be avoided:

- An α or β adrenergic blocker with clonidine: An apparent antagonism of clonidine action has been observed.
- **Nifedipine with diuretic:** Synergism between these two is still unproven.
- Methydopa with clonidine or any two drugs of same class.
- ACE inhibitor with ARB

- **Drugs used in chronic gout:**
  - **Xanthine oxidase inhibitor:** Allopurinol, Febuxostat
  - **Uricosuric agent:** Probenecid, Benzbromarone, Lesinurad, Sulfinpyrazone
  - **Uric acid metabolism:** Rasburicase, Pegloticase (convert purine to water soluble metabolite, allantoin → easily excreted).

417. Ans. (a) Hydroxychloroquine

Ref: Goodman and Gillman 13th ed. pg. 1256

- HCQ is known to cause, early onset maculopathy, which causes reduction in visual acuity.
- Fundoscopy reveals typical bulls eye maculopathy, which is an irreversible side effect of the drug.
- Other given drugs in option, are also DMARD's, and can be used in rheumatoid arthritis.

Extra Mile

Drugs causing ocular side effects

Drugs	Ocular side effects
Amiodarone	• Vortex keratopathy (corneal microdeposits)
Sildenafil	• Cyanopsia
Digoxin	• Xanthopsia
Tamoxifen	• Crystalline maculopathy/pigmentary retinopathy
Vigabatrin	• Visual field constriction
Ethambutol, Chloramphenicol	• Toxic optic neuropathy (progressive central scotoma)
Topical steroid	• Glaucoma
Systemic steroids	• Cataract
Thioridazine	• Retinal pigmentation

418. Ans. (c) Dihydroergotamine and Na+ Nitroprusside

Ref: Goodman Gillman 13th ed. pg. 233-34

- Ergot derivatives like Dihydroergotamine, Bromocriptine is associated with fibrotic reaction, that can cause gangrene like situation in this patient.
- Ergotamine is therefore not a preferred agent in migraine
- Agent that can be used in management of such condition is vasodilators like calcium channel blockers (DHP's), Na^+ Nitroprusside, alpha blockers.

Extra Mile

- DOC for migraine: Sumatriptan ($5HT_{1B/D}$ agonist)
- DOC for prophylaxis of migraine: Propranolol

Question 63

Which of the following drug is contraindicated in migraine:

(FMGE JULY 2024)

a. Propranolol
b. Ibuprofen
c. Sumatriptan
d. Nitro glycerine

419. Ans. (a) Propranolol

Ref: Katzung 14th ed. pg. 168, 291

- The shown case is possibly is of migraine patient.
- Drug of choice for prophylaxis of migraine is: Propranolol.
- Drug of choice for migraine treatment: Triptans (Sumatriptan, Rizatriptan, Naratriptan, Frovatriptan).

Agents used for prophylaxis of migraine:

- Beta blockers (Propranolol, Metoprolol, Timolol)
- Divalproex Na^+
- Verapamil
- TCA (Amitriptyline, Nortriptyline)
- Valproate
- Topiramate
- Botulinum toxin
- Methysergide

GRP antagonist

- Rimegepant
- Olcegepant
- Ubrogepant

420. Ans. (c) Flutamide

Ref: Katzung 14th ed. pg. 744

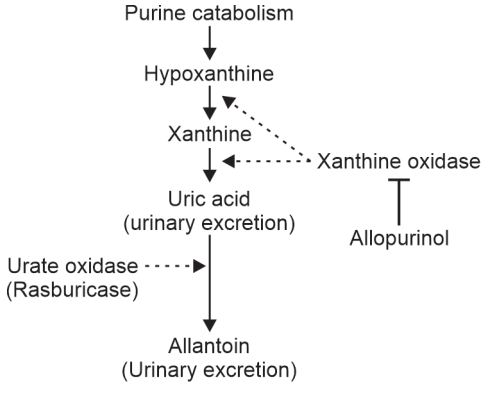
- Flutamide is a non-steroidal antiandrogen agent used in metastatic prostate cancer, treatment of hirsutism, juvenile nasopharyngeal angiofibroma.
- **Agents used for migraine prophylaxis:**

Please refer to above explanation

421. Ans. (a) Xanthine oxidase inhibition

Ref: Katzung 14th ed. pg. 661-62

- **Allopurinol** is DOC for chronic gout.
- MOA of Allopurinol: Xanthine oxidase inhibitor
- **Note:**
  - **Recombinant uricase:** Rasburicase, Pegloticase
  - **Uricosuric agent:** Probenecid, Benzbromarone, Lesinurad



- **SACD:** subacute combined degeneration of spinal cord; peripheral neuritis, paresthesias.
- **Glossitis, GI disturbance:** Damage to epithelial structures.

Preparation Dose and Administration

- **Cynocobalamin:** 35 µg/5 mL liquid; 100, 500, 1000 µg Inj.
- **Hydroxycobalamin:** 500, 1000 µg Inj.
- **Methylcobalamin:** 0.5 mg tab.
- In case of severe anemia (like pernicious anemia), Vitamin B_{12} should be given by IM or deep s.c (but not by IV) injection.
- Parenteral administration is necessary to bypass the defective absorptive mechanism.
- Hydroxycobalamin has been preferred for parenteral use because of better retention.

506. Ans. (c) Avidin

Ref: KD Tripathi, 6th ed. pg. 876

Question 64

In a patient with dyslipidaemia, is on Atorvastatin. Which of the following drug will be added to increase the HDL level:

(FMGE JULY 2024)

a. Niacin
b.
c.
d.

507. Ans. (b) Niacin

Ref: KDT, 6th ed. pg. 875

- Lipids that are liberated from adipose tissue are used to build very-low-density lipoproteins (VLDL) in the liver, which are precursors of low-density lipoprotein (LDL)
- Because niacin blocks the breakdown of fats, it causes a decrease in free fatty acids in the blood and, as a consequence, decreases the secretion of VLDL and cholesterol by the liver.
- When niacin is added to statins, it reduces carotid intima-media thickness, a marker of atherosclerosis.

- The clinical presentation of a chronic smoker with high fever, cough, confusion, and diarrhea, along with bilateral lung infiltrates on CXR, is suggestive of *Legionella* pneumonia.
- *Legionella* pneumonia is caused by the gram-negative bacterium *Legionella pneumophila*.
- It is commonly associated with water sources, such as hot water tanks, cooling towers, and air conditioning systems.
- Legionella pneumonia often presents with severe pneumonia and can cause extrapulmonary manifestations, including diarrhea and confusion.
- *Mycoplasma pneumoniae* (Option a) is a common cause of community-acquired pneumonia but does not typically present with diarrhea or confusion.

Question 65

Selective media for corynebacterium diphtheria?

(FMGE JULY 2024)

a. potassium tellurite agar
b. loeffler serum slope
c.
d.

28. Ans. (a) MacConkey's agar

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 42

- **MacConkey's agar** is a selective and differential culture medium commonly used in microbiology laboratories.
- It contains crystal violet and bile salts, which inhibit the growth of gram-positive bacteria and allow the growth of gram-negative bacteria.
- MacConkey's agar also contains lactose as a carbohydrate source and pH indicators (neutral red or crystal violet).
- Lactose fermenters, such as *Escherichia coli*, ferment lactose, producing acid that causes the colonies to appear pink or red on MacConkey's agar.
- Non-lactose fermenters, such as *Salmonella* and *Shigella* species, do not ferment lactose and produce colorless colonies.
- **Chocolate agar (Option b)** is an enriched medium used for the cultivation of fastidious organisms like *Haemophilus influenzae*.
- **Blood agar (Option c)** is a general-purpose medium used for the cultivation of a wide range of organisms and does not differentiate lactose fermenters from non-lactose fermenters.
- **Potassium tellurite agar (Option d)** is used for the selective isolation of *Corynebacterium diphtheriae*, the causative agent of diphtheria, and does not differentiate lactose fermenters from non-lactose fermenters.

29. Ans. (b) Vaporized H_2O_2

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 37

- Plasma sterilization, also known as low-temperature sterilization, is a method used to sterilize heat-sensitive medical equipment and instruments.
- In this process, vaporized hydrogen peroxide (H_2O_2) is commonly used as the sterilizing agent.
- The H_2O_2 is converted to plasma state by applying a high-frequency electric field, creating a plasma of reactive species.
- The reactive species, including free radicals and ions, have sterilizing properties and effectively kill microorganisms.
- **Ethylene oxide** (Option a) is another agent used for low-temperature sterilization, but it is not specific to plasma sterilization.
- **Aldehydes** (Option c), such as formaldehyde and glutaraldehyde, are commonly used as disinfectants and sterilant but are not specifically associated with plasma sterilization.

GENERAL MICROBIOLOGY, MEDIA, TESTING

30. Ans. (c) M. leprae

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 371, 372

- It has not been possible thus far to cultivate lepra bacilli either in bacteriological media or in tissue culture.
- It was discovered that lepra bacilli could multiply in the footpads of mice kept at a low temperature (20°C).

31. Ans. (c) Sodium hypochlorite

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 37

- Sodium hypochlorite is a disinfectant widely used in the hospitals at different concentrations.
- It is mainly used in blood spillage.

32. Ans. (b) Yellow

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 657

- The cotton swabs used for disinfection would be discarded in yellow bin.

33. Ans. (b) Transduction

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 68

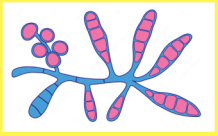
- **Transduction**, a process of genetic recombination in bacteria in which genes from a host cell (a bacterium) are incorporated into the genome of a bacterial virus

- Pseudomembranous colitis is caused by *Clostridium difficile* which produces toxins that damage the

Question 66

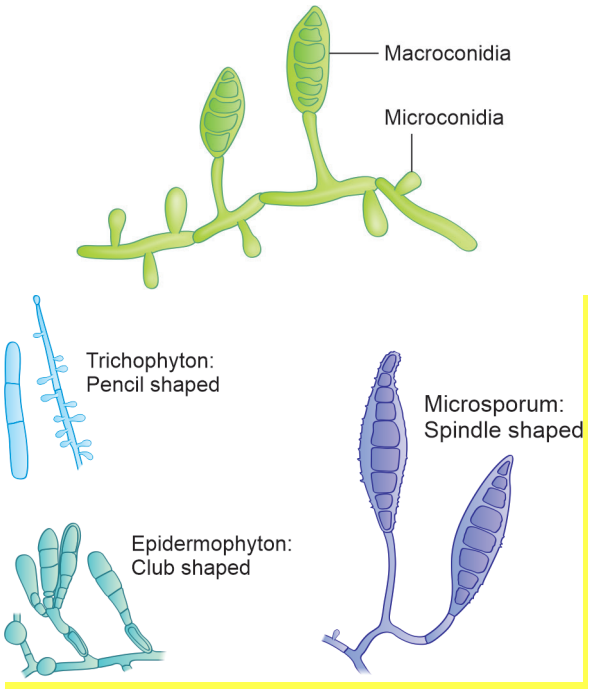
history given photomicrograph? *(FMGE JULY 2024)*

a. Trichophyton
b. Microsporum
c. Epidermophyton floccosum
d. Aspergillus



8. Ans. (a) *Trichophyton*

- Pencil-shaped macroconidia are seen in the genus *Trichophyton*. These macroconidia are spindle-shaped and have tapering ends. They are produced in chains on the hyphae of the fungus.
- *Trichophyton* is a genus of fungus that causes a variety of skin infections, including tinea pedis (athlete's foot), tinea cruris (jock itch), and tinea corporis (ringworm).



- ***Microsporum*** produces teardrop/spindle-shaped macroconidia.
- ***Epidermophyton*** produces clavate (club-shaped) macroconidia.
- ***Aspergillus*** produces septate hyphae, but does not produce macroconidia.

9. Ans. (b) IgG

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 98

- IgG antibodies are found in the highest concentration in blood/serum and play a critical role in long-term immunity. They can cross the placenta and provide passive immunity to the fetus.
- IgA antibodies are mainly found in body secretions such as saliva, tears, and breast milk.
- IgM antibodies are the first antibodies produced during an immune response.

10. Ans. (b) Kupffer cells

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 139

- Kupffer cells are specialized macrophages found in the liver.
- They play a crucial role in the immune response against pathogens and foreign substances in the liver.
- Kupffer cells are responsible for phagocytosing and clearing microorganisms, cellular debris, and toxins from the blood.
- Their presence in the liver helps to maintain its overall immune function and homeostasis.
- **Hofbauer cells** are involved in fetal development and immune regulation within the placental environment.
- **Mesangial cells** are located in the renal glomeruli and play a role in the structural support and filtration function of the kidney.
- **Monocytes** are circulating immune cells that can differentiate into macrophages when they migrate to different tissues, including the liver.

Extra Mile

- Macrophages in CNS: Microglial cell
- Macrophages in connective tissue: Histiocytes
- Macrophages in skin: Langerhans cell

11. Ans. (b) Autoimmunity

Ref: Harrison's Principles of Internal Medicine, 20th ed. pg. 2854

- Rheumatoid arthritis is an autoimmune disease characterized by chronic inflammation of the joints.
- In the case of rheumatoid arthritis, the immune system targets the synovium, which is the lining of the joints, leading to inflammation, pain, and joint damage.

12. Ans. (c) Mast cells

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 100

- The degranulation of mast cells releases histamine, which is responsible for the development of symptoms such as runny nose and wheezing.

FMGE SOLUTIONS

d. Chicken pox

- When mast cells degranulate in response to triggers such as allergens or irritants, histamine is released, leading to symptoms like nasal congestion, wheezing, and itching.

13. Ans. (a) Autograft

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 185

- An autograft refers to the transplantation of tissue from one part of the body to another within the same individual.
- In the given scenario, where the patient's own tissue was used for grafting, it indicates an autograft.
- Autografts are advantageous as they minimize the risk of rejection since the tissue is from the patient's own body.

Extra Mile

- An **allograft** involves the transplantation of tissue between individuals of the same species but with different genetic backgrounds.
- A **xenograft** involves the transplantation of tissue from one species to another.
- An **isograft** involves the transplantation of tissue between genetically identical individuals, such as identical twins.

14. Ans. (d) HSV

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 476

- Tzanck smear is a microscopic test used in the diagnosis of viral infections, particularly those caused by herpes viruses.
- It involves collecting a sample from a skin lesion, staining it, and examining it under a microscope.
- In the case of HSV infection, Tzanck smear typically reveals multinucleated giant cells with intranuclear inclusions, known as Tzanck cells. This finding is indicative of HSV infection.

Extra Mile

- **HIV** is typically diagnosed using serological tests that detect antibodies or viral nucleic acids.
- **HPV** is commonly diagnosed through visual inspection, Pap tests, or specific HPV DNA tests.
- **HDV** infection is typically diagnosed by detecting specific antibodies or viral RNA.

15. Ans. (d) Varicella zoster

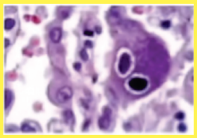
Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 478

- The image provided in the question shows a dermatomal distribution of painful blisters on the trunk, which is indicative of herpes zoster, commonly known as shingles.

Question 67

A 65-year-old patient on immunosuppressive therapy presents with a cough, fever, and pneumonitis. A biopsy reveals the basophilic inclusions. Which organism is responsible for the infection? *(FMGE JULY 2024)*

a. EBV
b. CMV
c. Pox virus
d. Chicken pox



16. Ans. (c) Cytomegalovirus

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 518

- The inclusion body shown in the image is characteristic of CMV infection. CMV is a member of the Herpesviridae family and commonly causes infections in immunocompromised individuals.
- The presence of large, intranuclear inclusion bodies, known as **owl's eye** or cytomegalic inclusion bodies, is a hallmark of CMV infection.

17. Ans. (a) Hepatitis A

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 545

- In the given scenario, the patient's gastrointestinal (GI) distress following the consumption of food outside suggests a possible foodborne infection.
- Hepatitis A virus (HAV) and hepatitis E are commonly transmitted through the fecal-oral route, often associated with contaminated food or water.
- It causes acute hepatitis characterized by symptoms such as nausea, vomiting, abdominal pain, and jaundice.
- Therefore, the patient's symptoms and history are consistent with hepatitis A infection.
- **Note:** Hepatitis B and hepatitis C are transmitted through blood transfusion, sexual contact or needle prick injury. Hepatitis D infection requires coinfection with hepatitis B.

18. Ans. (c) Measles

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 518

- The presentation of a maculopapular rash that begins behind the ears and then spreads to the face and rest of the body, accompanied by fever, conjunctivitis, and runny nose, is characteristic of measles.
- Measles, also known as rubeola, is a highly contagious viral infection caused by the measles virus. The rash typically appears a few days after the onset of fever and other symptoms.

Infectious mononucleosis is diagnosed by Paul Bunnel test.

Revision of Key Points About Infectious Mononucleosis

Question 68

CSF profile of a patient showed lymphocyte predominance, low glucose, high protein. It points towards

(FMGE JULY 2024)

a. Meningoencephalitis
b. Viral Meningitis
c. TB meningitis
d. Bacterial meningitis

BACTERIOLOGY

69. Ans. (a) Bartonella henselae

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 420

- A febrile illness with lymphadenopathy following a cat scratch had been known for long under the name 'cat scratch disease'.
- Symptoms typically include a non-painful bump or blister at the site of injury and painful and swollen lymph nodes.

70. Ans. (b) S. aureus

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 204

- Staphylococcus aureus is the single most common cause of bacterial infection among drug users.
- Persons who inject drugs are at increased risk of developing Staphylococcus aureus bacteremia.

71. Ans. (a) Propionibacterium acne

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 274

- Propionibacterium acnes is a gram-positive human skin commensal that prefers anaerobic growth conditions and is involved in the pathogenesis of acne
- Acne often debuts during changes in hormonal levels in pre-teens; however, it is also very common as an adult-onset condition, often associated with hormonal fluctuation during the menstrual cycle and pregnancy.

72. Ans. (b) TB meningitis

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 677

- Neutrophils (x 10^6/L) - Usually <100 (but may be normal)

Table to different TB/viral/bacterial meningitis

CSF Picture

Type	Cell	Protein	Glucose	Others
Normal	0-5 All Lymphocyte	20–40 mg/dL	50–70 mg/dL	Clear sterile
Acute Bacterial	↑↑ (100–10000) mostly neutrophils	↑ 100–200 mg/dL But not more than 500 mg/dL	↓ <40 mg/dL	Turbid, culture may be positive
Tubercular	↑ Lymphocyte in early week of infection. Later neutrophil elevated.	↑↑ 100–500 mg/dL may be even in gm/dL	↓ <40 mg/dL	AFB ZN stain ⊕ TB PCR cobweb formation ⊕
Aseptic viral	↑ (100–1000) mostly lymphocyte	↑ 50–200 mg/dL	Normal	Culture sterile

- Lymphocytes (x 10^6/L) - 50–1000 (but may be normal)
- Protein (g/L) - 1–5 (but may be normal)
- Glucose (CSF: blood ratio) - <0.3

73. Ans. (d) Sorbitol MacConkey agar

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 41

- Sorbitol MacConkey Agar is a selective, differential medium, used for the isolation of pathogenic Escherichia coli in a laboratory setting.

74. Ans. (b) Listeria

Ref: Jawetz, Melnick and Adelberg's Medical Microbiology, 28th ed. pg. 339

- Tumbling motility is one of the useful characteristics of Listeria monocytogenes.
- This can be helpful to identify the causative pathogen along with Gram staining before the confirmatory microbiological examination.

107. Ans. (d) 100

108. Ans. (b) ++

Ref: PubMed; http://www.hrsa.gov/hansensdisease/diagnosis/skinsmears.html

Refer to above explanation of Q. 89

109. Ans. (a) Bacillus anthrax

Ref: Harrisons, 19th ed. pg. 261e-2

- **There are three major clinical forms of anthrax:**
  - Gastrointestinal, cutaneous, and inhalational.
  - **Gastrointestinal anthrax** typically results from the **ingestion of contaminated meat**.
  - **Cutaneous anthrax** typically begins as a papule following the introduction of spores through an opening in the skin. This papule then evolves to a painless vesicle followed by the development of a coal-black, necrotic eschar.
  - **Inhalational anthrax is the** form most likely to be responsible for death in the setting of a bioterrorist attack.

110. Ans. (a) Flea

Ref: Harrisons, 19th ed. pg. 1070

- Plague is a systemic zoonosis caused by ***Yersinia pestis*.**
- It predominantly affects small rodents in rural areas of Africa, Asia, and the Americas and is usually **transmitted to humans by an arthropod vector (the flea).**
- Sometimes, infection follows contact with animal tissues or respiratory droplets.
  - The genus *Yersinia* comprises **gram-negative bacteria** of the family Enterobacteriaceae (gamma proteobacteria).

111. Ans. (b) Conjugation

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 60

112. Ans. (a) Transduction

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 61, 63

113. Ans. (c) Increase in size

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 24

Refer to above explanation of Q. 36

114. Ans. (d) H. pylori

Ref: Internet Source

- The rapid urease test also known as the Campylobacter like organism (CLO) test is **done for H. pylori** *in which the conversion of urea to ammonia and carbon dioxide by the urease enzyme present in the H. pylori is tested.*

Question 69

Rice water stools. Darting motility?

(FMGE JULY 2024)

a. Vibrio cholera
b.
c.
d.

115. Ans. (b) Listeria

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 226, 395

Listeria is the bacteria that is classically associated with tumbling motility.

Swarming Motility	Proteus
Gliding Motility	P. Aeruginosa, Mycoplasma
Darting Motility	Campylobacter, Vibrio Cholera
Falling Leaf Motility	Giardia
Shooting Star Motility	Vibrio
Cork Screw Motility	T. Pallidum
Lashing motility	Borrelia

116. Ans. (d) Gonococci

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 227

TABLE: Various Shapes of Bacteria

Shape	Associated bacteria
• Club Shape	Cornyebacteria
• Lanceolate	Pneumococci
• Half Moon/Lens	Meningococci
• Kidney Shape	Gonnococci
• Comma	Vibrio And Campylobacter

117. Ans. (c) Staph Aureus

Ref: Robbin's, 9th ed.

Diseases Characterized by Granulomas

- **Tuberculosis:** The granulomas of tuberculosis tend to contain necrosis ("caseating tubercules"), but non-necrotizing granulomas may also be present.

CBSPD
Dedicated to Education

Questions asked line to line from **FMGE Solutions** book in **FMG July 2024** with exact references from the book

144 MCQs came directly from **FMGE SOLUTIONS**

Authored by
Dr Deepak Marwah | Dr Siraj Ahmad

Scan to Get the Questions & Explanations

Question 70

History of pain in the right hypochondrium, diarrhoea with flask shaped ulcer in the intestine. Infection caused due to quadrinucleated cyst. What is the appropriate treatment?

(FMGE JULY 2024)

a. Metronidazole
b.
c.
d.

138. Ans. (a) Amoebic liver abscess

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 595, 625

AMOEBIC LIVER ABSCESS

- It is a liver abscess caused by Entamoeba histolytica
- It is common in tropical countries.
- It exists in vegetative form outside the body and is spread by the faeco-oral route.
- Presents with Pain in the right hypochondrium, fever, Profuse sweating and rigors, loss of weight etc.
- Investigation of choice: Ultrasound abdomen
- DOC: Metronidazole

139. Ans. (a) Bile solubility

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 206,218,219

- Organism causing respiratory tract infection (pneumonia) and alpha hemolysis is pneumococci.
- Two tests are commonly employed for distinguishing pneumococci from other alpha-hemolytic streptococci :
  1. *Optochin sensitivity*
  2. *Bile solubility*

140. Ans. (c) Adenosine triphosphate

- ATP is a nucleotide derived from adenosine that occurs in muscle tissue.
- It is the major source of energy for cellular reactions
- Energy is stored in the cell in form of ATP (Adenosine triphosphate)

141. Ans. (d) Staphylococcus aureus

Ref: Harrisons's, 19th ed.

- Pulmonary pneumatoceles are thin-walled, air-filled cysts that develop within the lung parenchyma.
- They can be single emphysematous lesions but are more often multiple, thin-walled, air-filled, cystlike cavities.
- Pneumatoceles are generally observed soon after the development of pneumonia and can be observed on the initial chest radiograph.
- *They are commonly caused by Staphylococcus aureus.*
- Other agents also causes pneumatocele including:
  - *Streptococcus pneumonia*
  - H. influenza,
  - E. coli
  - Group A streptococci
  - *Serratia marcescens*
  - Klebsiella pneumoniae, adenovirus, and tuberculosis.
- Noninfectious etiologies include hydrocarbon ingestion, trauma, and positive pressure ventilation.

142. Ans. (a) Staph. Aureus, H. influenza, Pseudomonas

Ref: Harrison's, 19th ed. pg. 145e3-e5

Most common cause of pulmonary infection in Cystic fibrosis.

Age group	MC Organism
Children	Staph Aureus
Adolescent &adult	Pseudomonas aeroginosa
Overall	Pseudomonas aeroginosa

143. Ans. (a) Bacitracin

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 201, 206-07, 2012

- The various species of Streptococcus can be checked by various drug disks which is indicated as whether it is sensitive or resistant to the drug.
- S. pyogenes is bacitracin sensitive.
- S. agalactiae is bacitracin resistant.
- S. pneumoniae is inhibited by optochin.
- S. viridans is not inhibited by optochin.

144. Ans. (c) Anaerobic streptococci

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 635-36

- Chronic burrowing ulcer is also known as Meleney's synergistic hospital gangrene.
- It is caused by a mixed pattern of organisms like: *anaerobic streptococci*, coliforms, Staphylococci, Bacteroides etc.

145. Ans. (a) Cellulitis

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 205

SKIN AND SOFT TISSUE INFECTION BY STREPTOCOCCUS

1. **Erysipelas**-diffuse infection involving the superficial lymphatics
2. **Impetigo**-superficial infection of skin (pyoderma)
3. **Cellulitis**-cellulitis is caused mainly by hemolytic streptococci. It specifically affects the dermis and subcutaneous fat.
4. **Lymphangitis**

172. Ans. (a) HIV

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 577

- HIV is a round, ball-shaped virus. It has two single strands of RNA for its genome.
- It has a protective envelope, which comes from the host cell's membrane.
- The proteins gp120 and gp41 help HIV enter a cell to infect it.
- The viral matrix helps anchor the envelope proteins to the rest of the virus particle.

173. Ans. (a) DNA

Ref: CDC. gov

RT-PCR catalyses the synthesis of c DNA copy of RNA present in COVID-19/SARS CoV 2 genome. This DNA is subsequently amplified. The number of amplifications required to generate a critical threshold value will depend on RNA load present in nasopharyngeal sample of patient.

174. Ans. (a) Chicken pox

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 477

- **The early (prodromal) symptoms** in adolescents and adults are nausea, loss of appetite, aching muscles, and headache. This is followed by the characteristic rash or oral sores, malaise, and a low-grade fever that signal the presence of the disease.
- **In children** the illness is not usually preceded by prodromal symptoms, and the first sign is the rash or the spots in the oral cavity. The rash begins as small red dots on the face, scalp, torso, upper arms and legs; progressing over 10–12 hours to small bumps, blisters and pustules; followed by umbilication and the formation of scabs.
- Commonly visible evidence of the disease develops in the oral cavity and tonsil areas in the form of small ulcers which can be painful or itchy or both; this enanthem (internal rash) can precede the exanthem (external rash) by 1 to 3 days or can be concurrent.
- These symptoms of Chicken pox appear 10 to 21 days after exposure to a contagious person.

175. Ans. (a) Coxsackievirus A16

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 498

- Hand-foot-and-mouth disease — a mild, contagious viral infection common in young children — is characterized by sores in the mouth and a rash on the hands and feet. Hand-foot-and-mouth disease is most commonly caused by a coxsackievirus A16.

Symptoms Include

- Fever
- Sore throat
- Painful, red, blister-like lesions on the tongue, gums and inside of the cheeks
- A red rash, without itching but sometimes with blistering, on the palms, soles and sometimes the buttocks
- Irritability in infants and toddlers
- Loss of appetite

176. Ans. (a) Nasopharyngeal swab for RT PCR

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 456

- Smell and taste disorders are reported very frequently and at an early stage in the evolution of the infectious disease caused by the SARS-CoV-2. These symptoms could be sensitive and specific to establish the condition of the infection, and may suggest the flow of decisions as to further therapy. So, RT-PCR molecular assays for SARS-CoV-2 detection is done.

177. Ans. (a) Chicken pox

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 477

- The classic symptom of Chicken pox is a rash that turns into itchy, fluid-filled blisters that eventually turn into scabs.
- The rash may first show up on the chest, back, and face, and then spread over the entire body, including inside the mouth, eyelids, or genital area.

178. Ans. (c) Measles

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 518

- The pick up point in question is rash starting from face and extending to trunk. This is seen with measles. The white lesion noticed inside the mouth by physician was koplik spots.
- The classic symptoms of measles include a four-day fever (the 4 D's) and the three C's—cough, coryza (head cold, fever, sneezing), and conjunctivitis (red eyes)—along with a maculopapular rash.
- Fever is common and typically lasts for about one week; the fever seen with measles is often as high as 40°C (104°F).

179. Ans. (a) Influenza virus

- The shown viral structure having neuraminidase, hemagglutinin etc. is of influenza virus.

Identify the other viral structures:

Corona virus

- Mucormycosis is an opportunistic fungal infection that mainly affects the patients with uncontrolled diabetes mellitus.

210. Ans. (c) Gardnerella vaginalis, metronidazole

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 682

- Gardnerella vaginalis commonly is associated with bacterial vaginosis.
- Treatment is generally directed against the anaerobic flora and consists of metronidazole, tinidazole or clindamycin for 5 to 7 days.

211. Ans. (d) HPV 6,11

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 557

- Condyloma acuminata refers to anogenital warts caused by human papillomavirus (HPV).
- The most common strains of HPV that cause anogenital warts are 6 and 11.
- HPV is a double-stranded DNA virus primarily spread through sexual contact.

212. Ans. (a) Mucormycosis

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 614

- Fungal infections, including mucormycosis, aspergillosis and invasive candidiasis, have been reported in patients with severe COVID-19 or those recovering from the disease and have been associated with severe illness and death.
- Outpatient use of systemic corticosteroids/other immunomodulating drugs for mild or moderate patients with COVID-19 should be avoided.

213. Ans. (b) Giardia lamblia

Ref: Ananthanarayana and Panicker's Textbook of Microbiology, 10th ed. pg. 579

- Giardia duodenalis aka Giardia intestinalis and Giardia lamblia, is a flagellated protozoa
- Giardia that colonizes the small intestine, causing a diarrheal condition known as giardiasis.

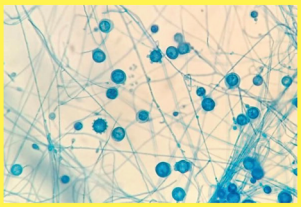
214. Ans. (b) Enterobius vermicularis

- The given stool preparation shows low magnification view of clusters of eggs of pinworm infection, also known as enterobiasis.
- The most common symptom is itching in the anal area. This can make sleeping difficult. The period of time from swallowing eggs to the appearance of new eggs around the anus is 4–8 weeks.

Question 71

Image based question on histoplasma

(FMGE JULY 2024)



a.
b.
c.
d.

215. Ans. (b) Histoplasma

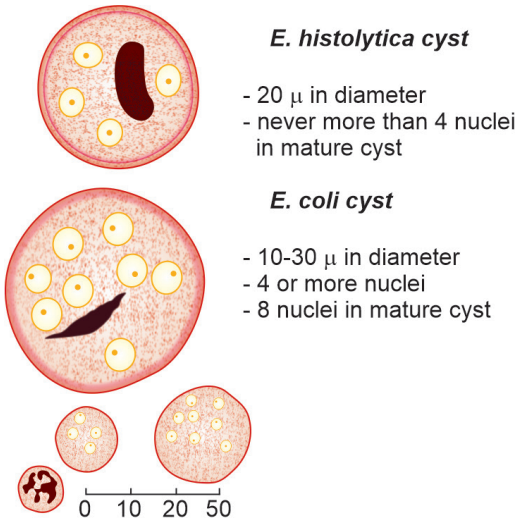
Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 610

- Histoplasmosis is a type of lung infection. It is caused by inhaling Histoplasma capsulatum fungal spores.
- These spores are found in soil and in the droppings of bats and birds.
- This fungus mainly grows in the central, southeastern, and mid-Atlantic states of USA.

216. Ans. (a) *E. histolytica*

Ref: Ananthanarayan and Paniker's Textbook of Microbiology, 10th ed. pg. 684

- The cyst in fecal sample is of *E. histolytica*, having around 4 nuclei in the mature cyst.



Must know questions about Tenia solium:

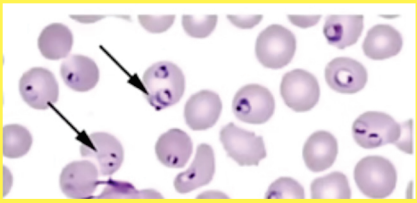
- **Life span:** >25 years; Cysticercus survives 5–6 years in human body
- **Final host:** Man
- **Intermediate host:** Pig/Man
- **Infective stage:** Cysticercus and Egg
- **Source of infection:** Consuming raw/undercooked pork
- **Inhabitation site:**
  - Adult org: In human intestine
  - Cysticercus: In tissues

226. Ans. (b) ***Candida albicans***

Question 72

Peripheral smear given with history of chills and fever?

(FMGE JULY 2024)



a. plasmodium vivax
b. plasmodium falciparum
C. plasmodium ovale
d. plasmodium malariae

228. Ans. (c) **Filaria**

Ref: Harrison 19th ed. pg. 1420

- Tropical or pulmonary eosinophilia is due to microfilaria in lung. There is no microfilaria in blood.
- It is characterized by coughing, asthmatic attacks and enlarged spleen.
- **DOC:** Diethylcarbamazine

229. Ans. (a) ***Schistosoma***

Ref: Harrison 19th ed. pg. 605

***Schistosoma* has 3 species mainly and resides in:**

- *S. mansoni:* Resides in mesenteric veins draining sigmoido-rectal region
- *S. japonicum:* Resides in mesenteric veins draining the ileocecal region
- *S. haematobium:* Bladder plexus
- *Fasciola:* Liver fluke (*Fasciola hepatica*)
- Paragonimus westermani: *Lung fluke*

230. Ans. (b) **Accidental intermediate host in humans**

Ref: Textbook of surgical gastroenterology pg. 767, PK mission ed 2016

Human echinococcosis is a zoonotic disease that is caused by parasites, namely tapeworms of the genus *Echinococcus*.

Transmission

- *E. granulosus* requires two host types, a definitive host and an intermediate host.
- The definitive host of this parasite are dogs
- Intermediate host are most commonly sheep, however, cattle, horses, pigs, goats, and camels are also potential intermediate hosts.
- Humans can also be an *intermediate host* for *E. granulosus*, however this is uncommon and therefore *humans are considered an accidental intermediate host.*

231. Ans. (c) **Plasmodium malariae**

Ref: Harrison's, 19th ed. pg. 1371

- *P. vivax*, *P. ovale*, show a marked predilection for young RBCs
- *P. malariae* has predilec tion for old RBCs
- *P. falciparum* can invade erythrocytes of all ages and may be associated with very high levels of parasitemia.

TABLE: Characteristics of plasmodium species infecting humans

	Finding of indicated species			
Characteristic	**P. falciparum**	**P. vivax**	**P. ovale**	**P. malariae**
Duration of intrahepatic phase (days)	5.5	8	9	15
Number of merozoites released per infected hepatocyte	30,000	10,000	15,000	15,000
Duration of erythrocytic cycle (hours)	48	48	50	72
Red cell preference	Younger cell (but can invade cells of all ages)	Reticulocytes and cells up to 2 weeks old	Reticulocytes	**Older cells**
Morphology of RBC and parasites	Usually only ring forms; banana-shaped gametocytes, (*Maurer dots*)	Irregularly shaped large rings and trophozoites; enlarged erythrocytes; (Schuffner's dots)	Infected erythocytes, enlarged and oval with tufted end; (James dots)	Band or rectangular forms of trophozoites common (Ziemann's dot)
Ability to cause relapses	No	Yes	Yes	No

- The male and female pinworms mate in the ileum.
- The gravid female pinworms settle in *the ileum, caecum, appendix,* and *ascending colon,* where they attach themselves to the mucosa and ingest colonic contents.

243. Ans. (c) Round worm

Ref: Manson's Tropical Diseases, 22nd ed. pg. 1516

- Older literature indicates that the pin worm is the parasite which multiples in the appendix and blocks the lumen causing appendicitis. Although new data indicates that the most common parasite in the appendix is the round worm or Ascaris lumbricoides.

244. Ans. (c) Causes cutaneous larva migrans

Ref: Manual of Family Practice, pg. 622

- Toxocara canis can cause visceral tarva migrans leading to hepatitis and pneumonitis. It can also lead to vision loss due to ocular larva migrans.
- The life cycle of Toxocara canis occurs in dogs and humans acquire the injectionas accidental hosts.

245. Ans. (b) Ancylostoma braziliense

Ref: Atlas of Clinical Microbiology Vol. II/Ch. 19

- Cutaneous larva migrans caused by Ancyclostoma braziliensie is the most common tropically acquired dermatosis. Using their proteases, larvae/penetrate through follicles, fissures or intact skin.

246. Ans. (c) Man is an intermediate host

Ref: Manson's Tropical Diseases, 22nd ed. pg. 1477

For filarial parasite	For malarial parasite
• Man: Definitive host • Mosquito: Intermediate host	• Man: Intermediate host • Mosquito: Definitive host

LYMPHATIC FILARIASIS

- Lymphatic filariasis is caused by W. Bancrofti, B. Malayi and B. Timori.
- Man is definitive host and mosquito acts as intermediate host.
- Microfilariae resides in the blood and adult worm in the lymphatics.
- The principal pathologic changes result from inflammatory damage to the lymphatics, which is caused by adult worms and not by microfilariae.

Clinical Manifestations

1. Asymptomatic or subclinical microfilaremia
2. Acute adenolymphangitis
3. Hydrocele
4. Chronic lymphatic disease

Diagnosis

- A definitive diagnosis can be made only by detection of parasite.
- Assays for circulating antigens of W. bancrofti permit

Question 73

Vector for orientia Tsutsugamushi?

(FMGE JULY 2024)

a. Louse
b. flea
c. mite
d. tick

247. Ans. (b) Epidemic typhus

Ref: Microbiology by Ananthanarayan and Paniker, 8th ed. pg. 410

Rickettsial Diseases

Disease	Cause	Vector
Epidemic typhus	R. Prowazeki	Louse
Endemic typhus	R. Typhii	Rat flea
Scrub Typhus	R. Tsutsugamushi	Trombiculid mite
Indian tick typhus	R. conori	Tick
RMSF	R. Ricketsii	Tick
Trench fever	Rochalimaea Quintana	Louse
Q fever	Coxiella burnetii	None but rarely soft tick

248. Ans. (d) Ileum & jejunum

Ref: Chatterjee, 12th ed. pg. 116

- Tapeworm infection can also be caused by eating raw or undercooked meat from an animal or a fish that has the larval form of the tapeworm cysts in its muscle tissue.
- Once ingested, the larvae then develop into adult tapeworms in the small intestine (jejunum and ileum).

TAPEWORMS

- Taenia saginata: The beef tape worm
- Taenia solium: The pork tape worm
- *Habitat of tapeworms: Small intestine (upper jejunum)*
- Definitive host: Man
- **Intermediate host:** Cattle (cow or buffalo) for T. Saginata Pig for T. Solium.

249. Ans. (a) Acute adenolymphangitis stage

- **Filariasis** is caused by thread-like nematodes, which are transmitted by black flies and mosquitoes.
- The adult worms, which usually stay in lymphatics, release early larval forms known as microfilariae into the

59. Ans. (a) Molluscum contagiosum

- Molluscum contagiosum caused by large DNA virus of pox group.
- Characterized by multiple, umbilicated pearly lesion
- More common in childhood and on face
- It tends to resolve spontaneously
- Lesion occurring on genitalia or lower abdomen in adult are almost always sexually transmitted.
- **HPE:** Molluscum bodies—multinucleated giant cell in the central keratinous core of lesion of giemsa stain.
- **Treatment:** Cryotherapy or KOH or Phenol application

60. Ans. (a) Impetigo

Ref: Pediatric Dermatology E book by Lawrence Schachner pg. 1338

- Impetigo is a highly contagious bacterial infection of

Question 74

Patient presents neurofibromas, cafe au lait spots and lisch nodules

(FMGE JULY 2024)

a. NF2
b. NF1
c. TSC1
d. TSC2

61. Ans. (a) Acoustic neuroma

Ref: Neurofibromatoses in Clinical Practice, pg. 47-48

- Neurofibromatosis is a type of autoimmune skin disorder, and is associated with several other systemic conditions/tumors.
- Acoustic neuroma is the most common neural tumor associated with NF-2

TABLE: Differences between NF1 and NF2

NF1	NF2
• Common (90% of all NF cases)	• Much less common (10% of all NF cases)
• Chromosome 17 mutations	• Chromosome 22 mutations
• Almost always diagnosed by age 10	• Usually diagnosed in second to fourth decades
• Cutaneous lesions common (>95%) ▪ Cafe au lait spots ▪ Lisch nodules ▪ Cutaneous NFs (often multiple) ▪ Plexiform NFs (pathognomonic)	• Cutaneous, eye lesions less prominent • Mild/few cafe au lait spots Juvenile subcapsular opacities
• CNS lesions less common (15-20%) ▪ 72/FLAIR hyperintensities (myelin vacuolization; lesions wax, then wane) ▪ Astrocytomas (optic pathway gliomas—usually pilocytic—other gliomas) ▪ Sphenoid wing, dural dysplasias ▪ Moyamoya ▪ Neurofibromas of spinal nerve roots	• CNS lesions in 100% ▪ Bilateral vestibular schwannomas (almost all) ▪ Nonvestibular schwannomas (50%) ▪ Meningiomas (50%) ▪ Cord ependymomas (often multiple) ▪ Schwannomas of spinal nerve roots

Extra Mile

Diagnostic criteria of NF1

Two or more of the following:

- At least six café-au-lait macules (>5 mm diameter in prepubertal individuals and >15 mm in postpubertal individuals)
- Freckling in axillary or inguinal regions
- Optic glioma
- At least two Lisch nodules (iris hamartomas)
- At least two neurofibromas of any type, or one plexiform neurofibroma
- A distinctive osseous lesion (sphenoid dysplasia or tibial pseudarthrosis)
- A first degree relative with NF1

TABLE: Diagnostic criteria for NF-2

Main criteria
Bilateral vestibular schwannomas or
First-degree relative with neurofibromatosis type 2 plus 1. Unilateral vestibular schwannomas or 2. Any two of the following: Meningioma, glioma, schwannoma, or juvenile posterior lenticular opacities

62. Ans. (b) Dermatome

Ref: PubMed

- The shown division is dermatomal division
- Dermatome is the area of the skin of the human anatomy that is mainly supplied by branches of a single spinal sensory root.

- Blaschko lines or the lines of Blaschko are thought to represent pathways of epidermal cell migration and proliferation during the development of the fetus.
- These lines are invisible but many inherited and acquired diseases of skin manifest themselves according to these patterns creating the visual appearance of these lines.

Contd...

Question 75

A child with sore throat started developing skin lesion as in the image below. What is the diagnosis?

(FMGE JULY 2024)

a. Guttate psoriasis
b. Pustular psoriasis
c. Erythrodermic psoriasis
d. Inverse psoriasis

FMG

1. **Plaque-type:** It is the **most common variety** of psoriasis.
   - Patients present with stable, slowly enlarging plaques, which remains unchanged for long periods of time.
   - The **most commonly involved areas are** the elbows, knees, gluteal cleft, and scalp. Involvement tends to be **symmetric**.
2. **Inverse psoriasis** affects the intertriginous regions, including the axilla, groin, submammary region, and navel.
3. **Guttate psoriasis (eruptive psoriasis):** This is **most common in children** and young adults.
   - Patients present with many small erythematous, scaling papules**, frequently after upper respiratory tract** infection with β-hemolytic streptococci.
4. **Pustular psoriasis:** Usually localized to the **palms and soles**, or may be generalized. Can present with fever and or pustular eruptions.

Treatment

- **Limited psoriasis:** Topical glucocorticoids, Calcipotriene (topical vitamin D analogue), retinoid (tazarotene).
- Widespread psoriasis:
  - **UV light:** Ultraviolet B (UVB), narrow band UVB, and ultraviolet A (UV A) light with either oral or topical **psoralens (PUVA)** is used.
  - **Methotrexate** is an effective agent, especially in patients with psoriatic arthritis.

Note: ***Oral glucocorticoids should not be used*** for the treatment of psoriasis due to the potential for development of life-threatening pustular psoriasis when therapy is discontinued.

97. Ans. (c) Tetracycline

Ref: Harrisons, 19th ed. pg. 352

ACNE VULGARIS

- It is a self-limited disorder primarily of teenagers and young adults.
- Increase in sebum production by sebaceous glands after puberty is a the permissive factor for the disease expression.
- **Clinical hallmark of acne vulgaris:** Comedone, which may be closed (*whitehead*) or open (*blackhead*).
- **The earliest lesions seen in adolescence** are generally mildly inflamed or noninflammatory comedones on the forehead.
- **Most common location for acne** is the face, but involvement of the chest and back is common.

Treatment of Acne

- **Minimal to moderate pauci-inflammatory disease** respond adequately to local therapy alone: Topical agents such as retinoic acid, benzoyl peroxide, or salicylic acid.
- *Given the image, it is obvious that the case is not a minimal to moderate case of acne vulgaris. It is more likely moderate to acne vulgaris with inflammatory papules, pustules and comedones.*
- **Harrisons states:** *"Patients with moderate to **severe acne with a prominent inflammatory component** will benefit from the addition of systemic therapy, such as **tetracycline** in doses of 250–500 mg BD or doxycycline in doses of 100 mg BD"*
- **If patients with** severe nodulocystic acne are unresponsive to the therapies discussed above: Treatment with the synthetic retinoid isotretinoin is the choice. Its dose is based on the patient's weight, and it is given once daily for 5 months.
- Isotretinoin gives excellent result, but its teratogenic side effects limits its use in reproductive age group females.

98. Ans. (a) Neurofibromatosis

Ref: Harrisons, 19th ed. pg. 2331

NF-1 is diagnosed when *any two of the following seven signs* are present:

1. Six or more café au-lait macules. *Café au-lait spots are the **hallmark of** neurofibromatosis and are present in almost 100% of patients.*
2. Axillary or inguinal freckling consisting of multiple hyperpigmented areas 2–3 mm in diameter.
3. Two or more iris Lisch nodules. Lisch nodules are hamartomas located within the iris and are best identified by a slit-lamp examination.
4. Two or more neurofibromas or one plexiform neurofibroma.
5. Osseous lesion such as sphenoid dysplasia (which may cause pulsating exophthalmos) or cortical thinning of long bones with or without pseudoarthrosis.
6. Optic gliomas are present in ≈15% of patients with NF-1.
7. First Degree relative with NF-1

99. Ans. (a) Alopecia areata

Ref: Harrisons, 19th ed. pg. 354-55

- **Alopecia is of two types:** Scarring and Nonscarring.

Scarring alopecia	Nonscarring alopecia
• It is associated **with fibrosis, inflammation,** and loss of hair follicles.	• In this type **the hair shafts are absent** or miniaturized, but the **hair follicles are preserved** *(reversible condition)*
• **Most common causes** of scarring alopecia are primary cutaneous disorder such as *lichen planus, folliculitis decalvans, chronic cutaneous (discoid) lupus,* or *linear scleroderma (morphea).*	• **The most common causes** of nonscarring alopecia include 1. *Androgenetic alopecia* 2. *Telogen effluvium* 3. *Alopecia areata* 4. *Tinea capitis*, and the early 5. Phase of *traumatic alopecia.* 6. SLE

Question 76

Chronic diarrhea associated with cutaneous lesion biopsy image was given

(FMGE JULY 2024)

a.
b.
c.
d.

in humans.
are: Erythromycin, clindamycin, doxycycline and minocycline.
ses actinomycosis.
ules form in a central purulence surrounded by neutrophils is very

121. Ans. (d) Dermatitis herpetiformis

Ref: Harrison, 19th ed. pg. 373

Diagnosis of Dermatitis Herpetiformis is confirmed by a simple blood test for IgA antibodies, and by a skin biopsy in which the *pattern of IgA deposits in the dermo-epidermal junction*, revealed by direct immunofluorescence.

Extra Mile

TABLE: Differentiating dermatitis herpetiformis, pemphigus and pemphigoid vulgaris

Feature	Dermatitis herpetiformis	Pemphigus vulgaris	Pemphigoid
Lesion	Intensely itchy vesicles, papulovesicles	Thin walled, delicate, flaccid bullae/ blister that rapidly rupture & erode	Large, tense often blood stained blisters
Area of predilection	Knees, elbows, scalp, buttock, & around axilla	Upper part of body Buccal mucosa is commonly involved	Lower part of body Mucosa not involved
Associated with	G.I. absorptive defect due to gluten enteropathy	• Acantholysis • Nikolsky sign	–
Lab finding	• Small intestine biopsy: partial villous atrophy • Lesion biopsy: Subepidermal blisters • IgA & neutrophils in papillary tips	• Lesion biopsy: ▪ **Acantholysis** ▪ ***Intraepidermal blisters*** ▪ Row of tomb stone ▪ IgG, C_3 complement deposition between epidermal cells.	• Lesion biopsy: ▪ **Subepidermal blisters** ▪ Subepidermal collection of IgG, C_3-complement, eosinophils, polymorphs.
Treatment	• Gluten free diet • *Dapsone (DOC)*	• Systemic steroid • Immunosuppresant	• Systemic steroid • Immunosuppresant

122. Ans. (a) Pemphigus vulgaris

Ref: Harrison, 19th ed. pg. 370

- The rounded keratinocytes with hyperchromatic nuclei and perinuclear halo (due to condensing of cytoplasm in periphery) are called **acantholytic cells.**
- It is seen in case of pemphigus vulgaris
- **Acantholytic cells** can be demonstrated in bed side by **Tzanck test.**

123. Ans. (c) Autoimmune

Ref: Harrison, 19th ed. pg. 370

PEMPHIGUS

- *Pemphigus is an autoimmune blistering disorder*
- It results from the loss of integrity of normal intercellular attachments with the epidermis.
- Commonly affects individuals of age between 40 and 60.
- Equal prevalence among males and females.
- There are five variants of pemphigus:
  - ***Pemphigus Vulgaris:*** *Most common type*
  - **Pemphigus Foliaceous:** Superficial pemphigus
  - **Pemphigus Vegetans.** Least common type
  - **Pemphigus Erythematous**
  - **Fogo Selvagem:** An endemic form of pemphigus foliaceus.
- ***Refer to above table***

124. Ans. (b) Intraepidermal

Ref: Harrison, 19th ed. pg. 371-72

- ***Pemphigus has intraepidermal bullae and Pemphigoid has subepidermal bullae***

TABLE: Difference between pemphigus and pemphigoid bullae

Features	Pemphigus	Pemphigoid
Row of Tomb stone	Present	Absent
Nikolsky Sign	Present	Absent
Bullae location	**Intraepidermal – flaccid Bullae**	**Subepidermal & tense Bullae**
Mucosa involvement	Present (common)	Absent or less common
Acantholysis	Present	Absent
Prognosis	Poor	Good

Question 77

A 40 year old male presents with painful gential ulcers along with painful buboes. He had a history of multiple sexual partners. What is the diagnosis?

(FMGE JULY 2024)

a. Chancroid
b. LGV
C. Herpes genitalis
d. Syphilis

Mnemonic

- ***TSH-N*** *(Trichophyton infects Skin, Hair and Nail)*
- ***MSH*** *(Microsporum infects Skin and Hair)*
- ***ESN*** *(Epidermophyton infects Skin and Nail)*

138. Ans. (d) All of the above

Please refer to above explanation

139. Ans. (d) Skin + Hair + Nail

Ref: Roxburg, 17th ed. pg. 39

- Trichophyton Infects skin, hair & nail.
- Infecting species include:
  - Trichophyton rubrum, mentagrophytes, violaceum, verrucosum and Schoenleinii.

140. Ans. (c) Both

- In the given choices, T. verrucosum and M. gypseum both infect skin and hair.

Please refer to above explanation

141. Ans. (b) Tinea capitis

Ref: Roxburg, 17th ed. pg. 41

- **Tinea capitis** is most commonly caused by Microsporum canis.
- Second MCC of Tenia capitis is Trichophyton tonsurans.
- It is never caused by epidermophyton as it does not involve hair.
- It presents with localized non-cicatricial alopecia, itching, scaling with or without boggy swelling of scalp & *easily pluckable hair.*
- Tenia capitis is diagnosed by potassium hydroxide (KOH) wet mounts of hair & scale.
- **Treatment:** Griseofulvin is DOC

142. Ans. (a) LGV (b) Syphillis

Ref: Neena Khanna Synopsis of Dermatology, 4th ed. pg. 322

- LGV is a STD, caused by chlamydia presents classically with painless lymphadenopathy.
- Mnemonic to remember LGV:
  - **ABCDEFG:** Asymptomatic, Bubo, Chlamydia, Doxy, Esthiomine, Fries test, Groove sign
- Syphilis: Genital ulcer (Hard Chancre: Single, clean based, indurated, non tender, does not bleed on touch)

Disease	Ulcer	Lymph node
Syphilis	Painless	Painless
Chancroid	Painful	Painful
LGV	Painless	Painful (Bubo)

143. Ans. (c) Chancroid

Ref: Harrison, 19th ed. pg. 881, 1134

- **Chancroid** is a bacterial STD caused by H.Ducreyi. It is characterized by **painful sores** on the genitalia. Chancroid is known to spread from one individual to another solely through sexual contact.

- A **chancre** on the other hand is a painless ulceration/ sore most commonly formed during the primary stage of syphilis.

144. Ans. (b) Hemophilus Ducreyi

Ref: Harrison, 19th ed. pg. 1012

- **School of fish appearance** stained smear from genital lesions in cases of chancroid. Causative agent of chancroid is Hemophilus ducreyi.
- H. Ducreyi a major cause of genital ulceration in developing countries characterized by painful sores on the genitalia. Another early symptom is dark or light-green shears in excrement.
- Chancroid starts as an erythematous papular lesion that breaks down into a painful bleeding ulcer with a necrotic base and ragged edge.
- ***H. ducreyi*** **can be cultured on chocolate agar.**

145. Ans. (a) Secondary syphilis

Ref: Harrison, 19th ed. pg. 1132

- **Hallmark features of SECONDARY SYPHILIS:** asymptomatic, bilateral symmetrical pleomorphic maculo-papular rash on palms and soles, non-tender lymphadenopathy.
- **Other findings:** Condyloma Lata**,** ***Moth Eaten Alopecia*** arthritis, proteinuria.
- **Features that are never seen:** Vesico-bullous lesions, intense pruritus, Interstitial Keratitis.

146. Ans. (a) Gonorrhoea

Ref: Harrison, 19th ed. pg. 1107-08

- Gonorrhea is STD caused by Neisseriae gonorrhea. It doesn't present with genital ulcer.
- Patient presents with *greenish yellow or whitish discharge from the vagina*, lower abdominal or, pelvic pain, burning when urinating, conjunctivitis, swelling of the vulva (vulvitis), burning in the throat (due to oral sex), swollen glands in the throat (due to oral sex)

Question 78

Malampati scoring system is used to assess

(FMGE JULY 2024)

a. Endptracheal tube insertion
b. Orogastric tube insertion
c. Oropharyngeal airway insertion
d. Nasopharyngeal airway insertion

ANSWERS WITH EXPLANATIONS

1. Ans. (a) Mallampati classification

Ref: Miller's Anesthesia 9th ed, pg. 1379

- The Mallampati classification is a valuable tool used in anesthesia and airway management. It assesses the view of the oropharynx to **predict the ease of intubation.**
- It involves a patient who is sitting upright, with open mouth, and maximum extended tongue while the clinician observes the visibility of the tonsillar pillars, the uvula, and the soft palate.
- This classification helps anesthetists determine the potential difficulty of intubation and make informed decisions about airway management techniques.

Extra Mile

- **Brodsky classification:** Brodsky classification assesses the severity of tonsillar hypertrophy, primarily for evaluating obstructive sleep apnea.
- **Friedman classification:** Friedman classification is used to assess the degree of obstructive sleep apnea by considering the factors, like tonsil size and lateral pharyngeal wall collapse.
- **Cormack–Lehane classification:** Cormack–Lehane classification is employed to grade laryngeal views during direct laryngoscopy, assisting in predicting the ease of intubation.

2. Ans. (c) Crystalloid

Ref: Sabiston's Surgery 21st ed, pg. 1538–1540

- Crystalloid solutions are the preferred intravenous fluids for surgical procedures. They consist of water, electrolytes, and sometimes glucose.
- These solutions are versatile and commonly used to maintain intravascular volume, they replace fluid losses, and correct electrolyte imbalances.
- Examples of crystalloid solutions include normal saline and Ringer's lactate. Their balanced electrolyte composition makes them suitable for various surgical scenarios.

Extra Mile

- Blood transfusion is administered when there is significant blood loss or specific clinical indications.
- Colloid solutions contain larger molecules and are used when there's a need to maintain colloid osmotic pressure or intravascular volume.
- Fresh Frozen Plasma (FFP) is used to correct coagulopathies and provide clotting factors.

3. Ans. (c) $NaHCO_3$

Ref: Sabiston's Surgery 21st ed, pg. 2717–2718

- Sodium bicarbonate (NaHCO3) was traditionally used in Advanced Cardiac Life Support (ACLS) to treat metabolic acidosis and certain arrhythmias. However, recent guidelines have shifted away from routine use of $NaHCO_3$ during ACLS. The focus is now on optimizing perfusion, early defibrillation, and appropriate administration of medications.
- ACLS drugs, like adrenaline (epinephrine) are administered to increase blood flow and perfusion during cardiac arrest. Amiodarone is used to manage certain shock-resistant ventricular arrhythmias.
- High voltage defibrillators are used to deliver synchronized shocks during ACLS to restore normal heart rhythms when appropriate.

4. Ans. (c) To create pneumoperitoneum

Ref: Schwartz Surgery 11th ed, pg. 459–460

- The shown device is a Veress needle, commonly used in laparoscopic surgery to create pneumoperitoneum. Pneumoperitoneum involves introducing carbon dioxide (CO_2) gas into the abdominal cavity, which lifts the abdominal wall away from internal organs and creates a space for laparoscopic instruments.
- Pneumoperitoneum provides a clear visual field and allows for safe insertion of laparoscopic instruments during minimally invasive procedures.

5. Ans. (a) FiO_2 is 0.24 to 0.45

Ref: Morgan and Mikhail, Clinical Anesthesia 7th ed, pg. 2147

The image shown here is of nasal cannula.

- It is a soft single-ended plastic tube with nasal prongs for the nose connected overhead.
- FiO_2 of the nasal cannula is between 0.24 and 0.45
- FiO_2 is the concentration of oxygen that a person inhales during inspiration.
- The actual FiO_2 delivered to adults with nasal cannula is determined by:
  - Oxygen flow-major factor
  - Nasopharyngeal volume
  - Patient's inspiratory flow

FMGE SOLUTIONS

Question 79

Most common intravenous anesthetic used for Total intravenous anesthesia (TIVA)

(FMGE JULY 2024)

a. Propofol
b. Thiopentone
c. Etomidate
d. Ketamine

63. Ans. (a) Propofol, Sodium thiopentone, Etomidate

- Among the given choices only option A contains all the IV hypnotic drugs, namely Propofol, Thiopentone and Etomidate
- **Option B:** Halothane is inhalational anaesthetic agent
- **Option C:** Sugammadex is an antidote of NDMR overdose (like Rocuronium)
- **Option D:** These agents are Non depolarizing muscle relaxant.

64. Ans. (a) Propofol

Propofol:

- It is most commonly used IV anesthetic agent for day care surgery
- It has less residual impairment
- Onset of action: 45 seconds
- Duration of action: ~ 15 minutes
- Non irritant to airways and has antiemetic property

Extra Mile

- Anesthetic agent of choice for day care surgery: **Propofol**
- IV anesthetic agent of choice in patients with malignant hyperthermia: **Propofol**
- Agent of choice for induction in children: **Sevoflurane**
- Anesthetic agent preferred in neurosurgery: **Isoflurane**
- Anesthetic agent safest in unskilled hand and is highly inflammable: **Ether**
- Preferred anesthetic agent in bronchial asthma: **Halothane**
- Agent with high MAC, and has second gas effect: **Nitrous oxide**
- Agent preferred in aneurysm surgery and cardiac disease: **Etomidate**

65. Ans. (b) Thiopentone

- Barbiturates increases heme synthesis by inducing mitochondrial enzyme ALA synthetase, which can precipitate acute intermittent porphyria. Therefore, barbiturates are contraindicated in patients with AIP.
- Example of drugs that can precipitate AIP: Phenytoin, Rifampicin, OCP, Barbiturates, Sulfonamides.

Extra Mile

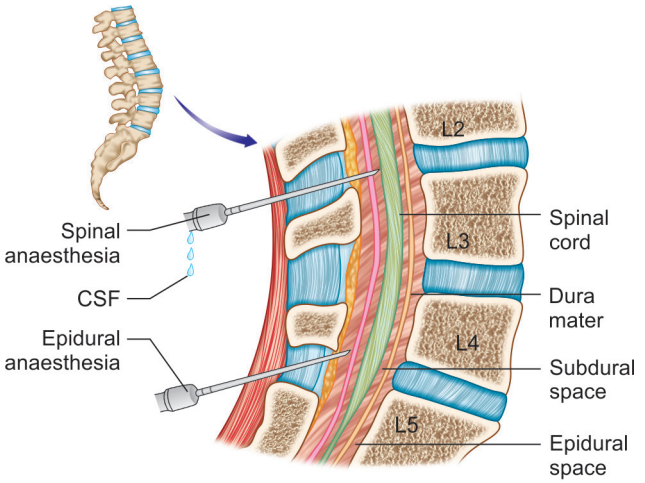
CONTRAINDICATION OF BARBITURATES

- Impaired hepatic and renal function
- Emphysema and pulmonary insufficiency
- Acute intermittent porphyria
- CHF and Hypovolemic shock
- Idiosyncratic patients

66. Ans. (c) L 3–L4

Ref: Basic Clinical Anesthesia by Paul K pg. 217

- Spinal anesthesia is required mainly in lower abdominal surgery such as inguinal herniorrhaphy, appendectomy, abdominal hysterectomy or caesarean delivery.
- It is preferably given at L3–L4
- Above L3 there is a risk of traumatic damage to spinal cord



L = Lumbar vertebra

67. Ans. (a) Dose

Ref: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4823409

- The duration of spinal anesthesia is based directly on dose or concentration of anesthetic agent.
- One study also states that final level of block can be predicted by patient height and weight.
- The data shows that the time to attain a suitable sensory level for surgery and duration of action correlates incrementally with height and inversely related to weight.

68. Ans. (b) Halothane

Ref: Katzung 14th ed. pg. 449

- Halothane is known anesthetic agent to produce hepatotoxicity (Halothane hepatitis).
- **Incidence:** 1 in 20,000 to 35,000. Seen on repeated exposure with halothane and NOT with other

Question 80

What does ASA grade 1 means ?

(FMGE JULY 2024)

a. Mild systemic disease
b. Moderate systemic disease
c. Healthy person/patient
d. Severe systemic illness

ASA SCORING

- **American Society of Anesthesiologist** classification system developed to categorize patient's physiological status that helps in predicting the operative risk.

ASA classification	Description	Example	Perioperative mortality risk
1	A normal healthy patient		0.1%
2	Patient with mild systemic disease	Controlled epileptic patient	0.2%
3	Patient with severe systemic disease	Poorly controlled diabetes mellitus	1.8%
4	Patient with severe systemic disease that is constant threat to life	Dyspneic patient	7.8%
5	A moribund patient who is not expected to survive without operation	Hypovolemic shock	9.4%
6	Declared brain dead, whose organs are being removed for donation		

Extra Mile

- **Aldrete/Modified aldrete scoring system:** For determination of discharge of patient from anesthesia care unit
- **Wilson scoring system:** For ease of laryngoscopy *(score < 5 = easy laryngoscopy; Score > 7 = Severe difficulty in laryngoscopy)*
- **P-POSSUM scoring system:** For predicting the mortality of neurosurgical patients

93. Ans. (c) Both

Thiopentone is preferred as an induction agent because of:

- Ease and rapidity of induction
- Absence of stage of delirium
- Rapid recovery
- Ability to increase depth rapidly

94. Ans. (b) Increased mucosal clearance

Ref: Handbook of Clinical Anesthesiology 3rd ed. by Brian Pollard 120

- *From an anesthesiologist's perspective, smoking increases the relative risk of postoperative pulmonary complications by up to six times.*
- A common concern is the increased risk of laryngospasm and bronchospasm.
- *Smoking increases airway mucous production and impairs ciliary function resulting in poor sputum clearance. This in combination with smoke-induced impairment of immune function, increases the likelihood of developing postoperative pneumonia.*
- **The pre-operative effect of smoking on respiratory system are:**
  - Hyper-reactive airways especially small airways
  - Reduced muco-ciliary clearance
  - Increased mucus secretion
  - Altered surfactant and permeability
  - V/Q mismatch

INTRA-OP AND POST-OP PATIENT CARE

95. Ans (a) A

Ref: Morgan and Mikhali's Clinical Anesthesia 5th ed. pg. 10-12 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3821267/

- The oxygen cylinder color code in India is a black body and white shoulder-coloured cylinder. Therefore, oxygen cylinder marked at A will be given to this patient
- **Note:** *Detailed data about color coding of cylinder and pin index is given later in this book*

96. Ans. (b) Decrease the FiO_2

Ref: Morgan and Mikhali's Clinical Anesthesia 5th ed. pg. 1297

- The highest priority at the start of oxygen therapy is providing effective oxygenation.
- In this case, the patient is hypoventilating which is causing CO_2 retention.
- To overcome this, we have to decrease the FiO_2 in order to maintain adequate ventilation and to wash off excess CO_2.

97. Ans. (d) Dura

Ref: Grey's Anatomy 41st ed. pg. 762

- For Epidural anesthesia the needle must pass through five distinct tissue layers: Skin, subcutaneous fat,

103. Ans. (d) Mobility of fracture

Ref: Textbook of Neurosurgery, 3th ed. pg. 2713

Factors Favoring Fat Embolism

Traumatic	Non-traumatic

Question 81

In a cardiac arrest victim in presence of more than one rescuer. What is ratio of compression and ventilation ratio

(FMGE JULY 2024)

a. 30:2
b. 15:2
c. 15:1
d. 30:1

MISCELLANEOUS

104. Ans. (d) Venturi mask

Ref: Miller's Anesthesiology 8th ed. pg. 756-758

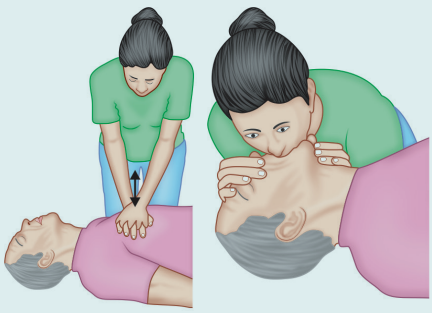
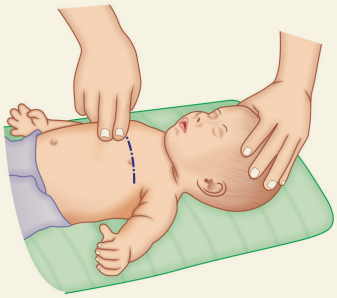
- The shown instrument is Venturi mask
- Venturi masks are low-flow masks that use the Bernoulli principle to entrain room air when pure oxygen is delivered through a small orifice, resulting in a large total flow at predictable FiO_2.
- While the Venturi mask is effective at delivering accurate oxygen concentrations (FiO_2), it requires relatively high oxygen flow rates to achieve this.

105. Ans. (c) 100–120 per minute

Ref: American Red Cross CPR Guidelines 2018-19

- CPR is cardiopulmonary resuscitation. According to latest 2018-19 CPR guidelines, the number of chest compression per minute in adult or infant is same i.e. 100 per minute.

TABLE: American Red Cross- New CPR Guidelines 2019

	Adult	Infant
Depth of compression	At least 2"	1 ½"
Breathing	Look for chest rise Deliver breaths over 1 second	Look for chest rise Deliver breaths over 1 second
Compression to breath ratio	30 : 2	30 : 2
Compression rate	100-120/minute (until help/paramedics arrive)	100/min
Site of chest compression	One hand should be placed on the breast bone in the center of the chest, second hand should be placed on first while keeping fingers off the chest (Image)	Use 2–3 fingers in the center of the chest on the lower half of the breast bone to compress the chest about 1 ½'' (Image)
		

106. Ans. (c) Trachea

Ref: Emergency Procedure and Techniques, pg. 48

HEIMLICH MANEUVER

The primary indication for use of the Heimlich maneuver is *upper airway obstruction due to a bolus of food* or any aspirated foreign material unrelieved by coughing and traditional means that now is causing complete airway obstruction and threatening asphyxiation.

ANSWERS WITH EXPLANATIONS

MOST RECENT QUESTIONS 2023

1. Ans. (a) Obesity hypoventilation syndrome

Ref: Harrison 21st ed. pg. 2203

- BMI >40 indicates morbid obesity. Extreme fat in chest wall limits chest expansion and explains the low pO_2 and the build-up of CO_2 in this patient. Carbon dioxide depresses the brain and hence, the excessive sleepiness

Question 82

50-year-old man presents with history of TB complaints of pedal edema, lightheadedness and abdominal distention. Neck veins are also prominent which of the following findings will be likely seen in this patient

(FMGE JULY 2024)

a. Pulsus bisfiriens
b. Kusumal breathing
b. Decreased SBP
d. Fine crepitations

Ref: CMDT 2023, pg. 885

- RTA 4 has resistance of aldosterone and hence, potassium and hydrogen cannot be excreted. This explains metabolic acidosis with hyperkalemia. In all other varieties of RTA, potassium leaks from kidney tubules and causes hypokalemia.
- Ureterosigmoidostomy is a diversion procedure done in patients with cancer of urinary bladder. Urine diverted to colon causes diarrhea and hypokalemia.

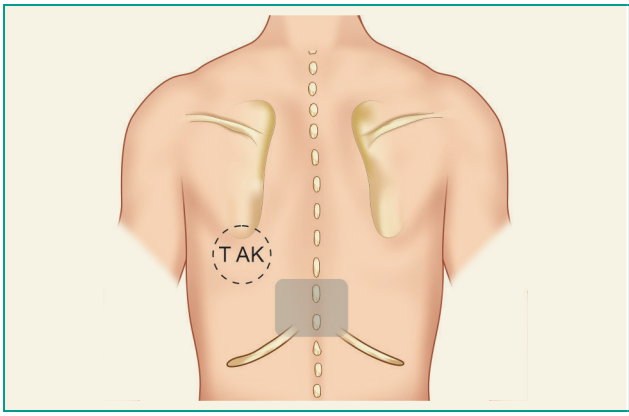
3. Ans. (a) Lymphocytosis, low sugar and high protein

Ref: Harrison 21st ed. pg. 1117

Child is having signs of meningeal irritation and contact with case of TB. Hence, findings of TB meningitis are to be selected. Since the process is slow and develops over couple of weeks, the usual cells seen at diagnosis are lymphocytes. The proteins are grossly elevated forming a cob -web coagulum in the test tube in which the sample is collected. CSF sugar is always reduced due to inflammatory process. Correct answer is option a.

4. Ans. (a) Cardiac Tamponade

Ref: Harrison 21st ed. pg. 2020



Lung malignancy can be spread to the heart causing malignant pericardial effusion and cardiac tamponade if undetected. The mass effect of this pericardial effusion falls on left lower lobe leading to lung consolidation. This explains bronchial breathing at left infero-scapular region and is called Ewart's sign. The lightheadedness of patient can be explained due to low BP caused by cardiac tamponade.
Pleural effusion presents with reduced is entry and stony dull percussion note and is hence ruled out.

5. Ans. (b) Pleural effusion

Ref: Harrison 21st ed. pg. 2198

Pneumonia patient is having reduced air entry in left side with percussion note of stony dullness indicating development of parapneumonic effusion.
Option a will have low BP with Ewart's sign. It is seen usually with malignant pericardial effusion/cardiac tamponade. Option c is ruled out as it has absent air entry and absent breath sounds. Option d (pneumomediastinum) will have auscultatory finding of Hamman crunch sign.

6. Ans. (c) History of stroke

Ref: Harrison 21st ed. pg. 3344

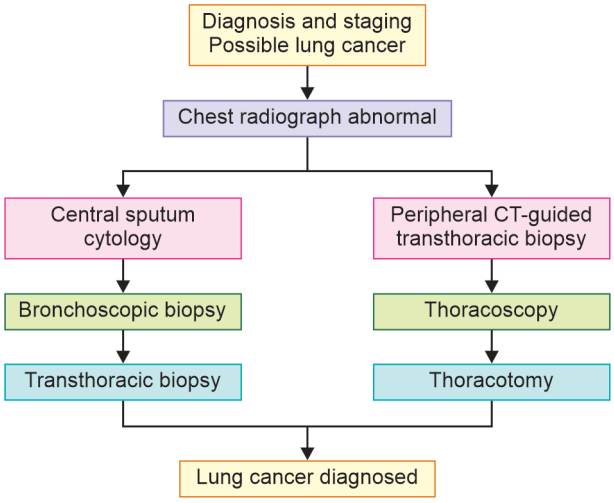
$ABCD_2$ score is used to predict the chances of development of stroke in a patient presenting with transient ischemic attack. Option c is wrong as it is not the history of stroke but clinical features of stroke that are taken into consideration.

any additional information about diagnosis. Option d will help in lowering of BP and reduce pulmonary edema but emergency surgical repair is the best way for management.

63. Ans. (a) CT guided Biopsy

Ref: Harrison 21st ed. pg. 270

Since the patient is having a peripheral lung tumor, CT guided transthoracic biopsy will be used for tissue diagnosis. Option b (bronchoscopy) will be used for central lung cancer.



64. Ans. (b) Relative/apparent erythrocytosis

Ref: Harrison 21st ed. pg. 439

Polycythemia vera	JAK 2 mutation	Excess production of RBC due to clonal expansion of normoblasts
Secondary polycythemia	Hypoxia due to COPD or cyanotic heart disease	Excess production of RBC due to increased erythropoietin levels
Gaisbock syndrome/Relative polycythemia	Volume depletion due to excess diuretics	RBC count is increased due to reduced plasma concentration

65. Ans. (a) Pseudotumor cerebri

Ref: Harrison 21st ed. pg. 2937

The keywords papilledema and raised ICP narrow down the diagnosis to pseudotumor cerebri. It is caused by use of OCP, excess vitamin A, steroid withdrawal and leads to features of raised ICP.

Option b leads to pulsatile headache. Option c presents with jaw claudication and temporal headache. Option d presents with ptosis and diurnal variation of symptoms.

Question 83

18-year-old girl has lid drooping that increases with day progression. Diagnosis is?

(FMGE JULY 2024)

a. M. Gravis
b. Fibromyalgia
c. Myotonic dystrophy
d. GBS

67. Ans. (b) Myasthenia gravis

Ref: Harrison 21st ed. pg. 3511

Ptosis with diurnal variation of symptoms and relief with acetylcholinesterase inhibitors are features of Myasthenia Gravis. Option a presents with arm and leg weakness with areflexia and is commonly associated with lung cancer. Option c presents with Gower sign and pseudohypertrophy of calf muscles. Option d presents with asymmetrical arm weakness progressing over years and features of both LMN and UMN lesion.

68. Ans. (b) Hereditary spherocytosis

Ref: Harrison 20th ed. pg. 780–907

Acute ITP	Steroids TPO-RA and Rituximab
Chronic ITP	ITP can resolve spontaneously in adults. So splenectomy should only be done as last resort.
Hereditary spherocytosis	Severe case: elective splenectomy at 4-6 years Moderate case: delay splenectomy till puberty Mild case: avoid splenectomy
G6PD	Avoid drugs that trigger hemolysis
Hairy cell leukemia	Cladribine

69. Ans. (b) Lanreotide Depot formulation

Ref: Harrison 21st ed. pg. 2913

The main objective is to shrink the pituitary tumor for which long-acting form of octreotide called Lanreotide is used. Options a, c and d are used in bleeding esophageal varices.

70. Ans. (b) Decreased haptoglobin

Ref: Robbins and Cotran, E-Book, pg. 215

Hemolysis will cause LDH to rise. Free hemoglobin will bind to haptoglobin. Consumption of haptoglobin explains decreased haptoglobin. Hemolysis leads to reticulocytosis and elevated unconjugated hyperbilirubinemia.

71. Ans. (c) Tc 99 Sestamibi Scan

Ref: Harrison 21st ed. pg. 2984:

The presence of lytic lesion in metacarpal bones and renal stones, result implies elevated serum calcium and elevated PTH. To locate parathyroid tumor, "sestamibi scan" is done. Another keyword is brown tumor which indicates hyperparathyroidism.

72. Ans. (d) Nasal cannula

Delivery of Oxygen

Class	Device	Oxygen flow (L/min)	Approx FiO_2	Comments
Variable delivery	Nasal prongs	2 4 6	28% 35% 45%	Stable patients only
	Semi-rigid (Hudson mask)	5 6 8 10 12	35% 50% 55% 60% 65%	Low cost Frequently Used Not accurate at controlling FiO_2

73. Ans. (d) Neurogenic tumors

Ref: Robbins and Cotran E-book, 2021 ed.

TABLE: Mediastinal tumors and other masses

Superior mediastinum
Lymphoma
Thymoma
Thyroid lesions
Metastatic carcinoma
Parathyroid tumors
Anterior mediastinum
Thymoma
Teratoma
Lymphoma
Thyroid lesions
Parathyroid tumors
Posterior mediastinum
Neurogenic tumors (schwannoma, neurofibroma)
Lymphoma
Gastroenteric hernia
Middle mediastinum
Bronchogenic cyst
Pericardial cyst
Lymphoma

74. Ans. (b) Temporal arteritis

Ref: Harrison 21st ed. pg. 2811

- Keyword is nodular thickening of temporal artery which is seen in temporal/giant cell arteritis. It is a leading cause of vasculitis in geriatric population and is an extra-cranial cause of headache. Temporal artery supplies the skin of scalp and narrowing will cause ischemia of scalp which is perceived as headache by the patient.
- Option a involves subclavian arteries and leads to arm claudication. Option c leads to intermittent claudication and causes gangrene of toes. Option d presents as extensor purpura on buttocks or back of thighs.

75. Ans. (b) Gilbert Syndrome

Ref: Harrison 21st ed. pg. 2559

Question 84

HIV positive patient presents with cough and difficulty in breathing. CD4 count is 200 gells/cu.mm. CXR is shown below. Select the right combination for the case.

(FMGE JULY 2024)

a. Mucormycosis, LAMB
b. Aspergillus, Voriconazole
c. P. Jiroveci, cotrimoxazole
d. Histoplasmosis, Itraconazole

76. Ans. (a) MAI

Ref: Harrison 21st ed. pg. 1404

Keyword is acid fast bacilli and CD4 count less than 100 narrows down diagnosis as Mycobacterium avium-intracellulare (MAI).

Common opportunistic infection in AIDS Patients

CD4 count <500 cells/mm^3	Mycobacterium Tuberculosis
CD4 count <200 cells/mm^3	Pneumocystis Jiroveci
CD4 count <100 cells/mm^3	Cerebral toxoplasmosis
D4 count <50 cells/mm^3	CMV Retinitis Mycobacterium avium-intracellulare

77. Ans. (c) CT chest

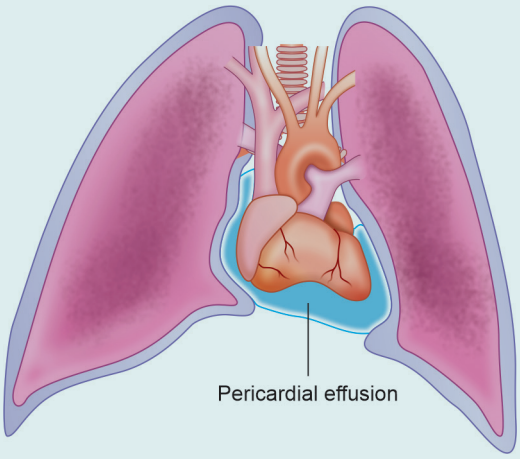
Ref: Harrison 21st ed. pg. 270

- CT chest needs to be performed to identify the source and location of source of hemoptysis. Option a (bronchoscopy) would be done after CT scan. Repeat CXR would not provide any new information. Option d is not done. Along with CXR, complete blood count, serum creatinine and coagulogram are done.

82. Ans. (a) Cardiac tamponade

Ref: Harrison 21st ed. pg. 2020

The logic is that the base of left lung is compressed by massive pericardial effusion. Therefore, when you examine below the angle of left scapula it leads to patch of dullness and increased vocal fremitus.



83. Ans. (d) Cardiac tamponade

Ref: Harrison 21st ed. pg. 2022

Traditionally we use the term muffled heart sounds for cardiac tamponade. But in this question the term used was smooth/ diminished heart sounds. The classical features of Beck's triad, hypotension with diminished heart sounds help in diagnosis. The third component of elevated JVP was given as absent y descent. The reason for absent y descent is elevated end diastolic pressure to increased intrapericardial space pressure that hampers filling of heart chambers.

84. Ans. (a) Hypothermia

Ref: Harrison 21st ed. pg. 3632

ECG finding of Hypothermia shows a J wave at the start of ST segment along with PR prolongation and broadening of qRS complex.

85. Ans. (c) Disability

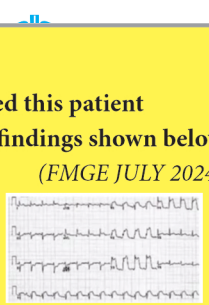
Ref: AHA 2020 Guidelines

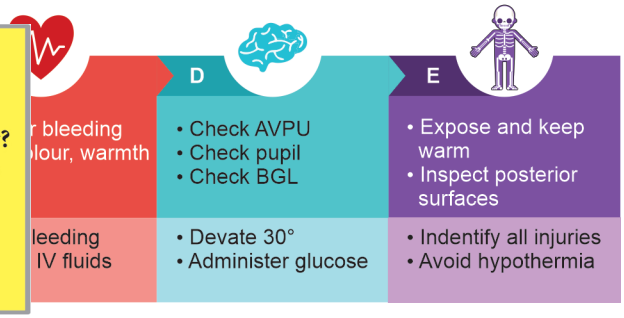
- The Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach is applicable in all clinical emergencies for immediate assessment and treatment.
- It would involve checking for AVPU which is an acronym for **'Alert', 'Voice', 'Pain', 'Unresponsive'** status apart from checking pupillary size and response to light.

Question 85

Which wall of myocardium is involved this patient presenting with chest pain and ECG findings shown below?

a. Mucormycosis, LAMB *(FMGE JULY 2024)*
b. Aspergillus, Voriconazole
c. P. Jiroveci, cotrimoxazole
d. Histoplasmosis, Itraconazole

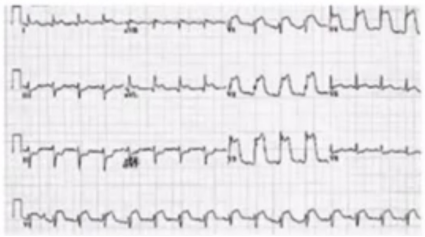




86. Ans. (b) Inferior wall MI

Ref: Harrison 21st ed. pg. 2053

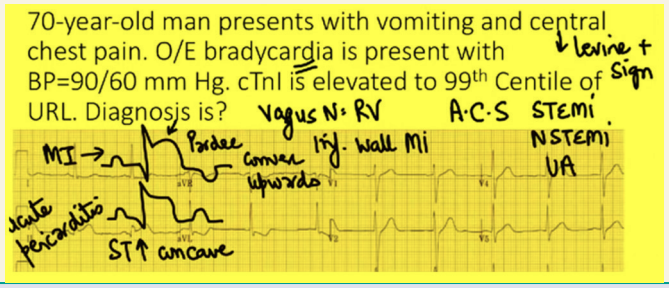
- ECG shows ST Elevation in lead II, III and aVF. Heart rate is 60 bpm which is seen in inferior wall MI
- Option a will show ST segment changes in lead I, aVL, V1 to V4.



- Option c will show ST segment changes in all the leads of ECG
- Option d will show ST segment changes in lead V7 to V9.

Extra Mile

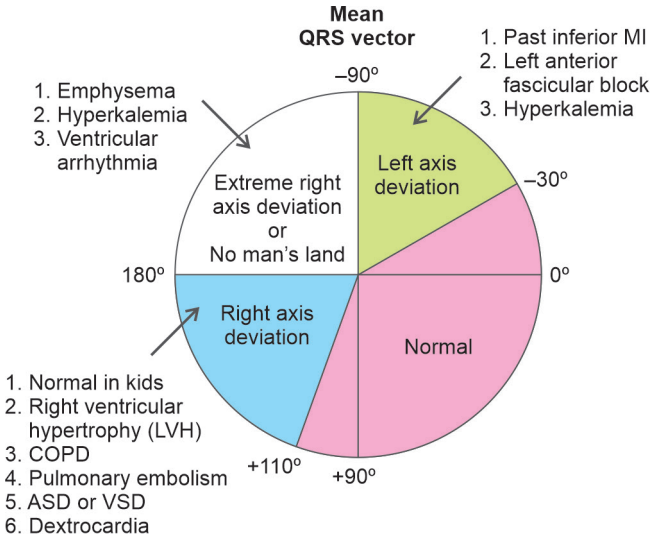
A 70-year-old man presents with vomiting and central chest pain. O/E bradycardia is present with BP = 90/60 mm Hg. cTnl is elevated to 99th Centile of URL. Diagnosis is?	This must know Clincial vignette published by me is a must know for every physician.



87. Ans. (a) Right ventricular hypertrophy

Ref: Harrison 21st ed. pg. 1825

The vector points in right lower quadrant and is seen in cases of right ventricular enlargement.

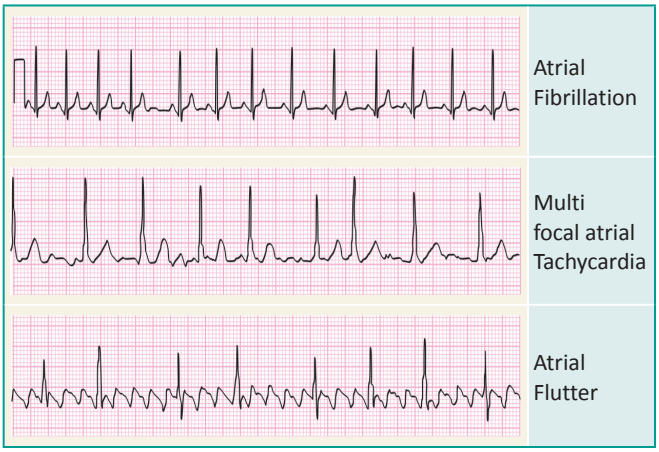


88. Ans. (d) Sinus arrhythmia

Ref: Ganong 25th ed. pg. 527

The ECG shows variation in RR interval, but P waves are present before each qRS complex. This is seen in sinus arrythmia.

- Atrial Fibrillation is ruled out as P wave is present preceding each qRS complex
- Atrial flutter is ruled out as saw tooth waves are not present
- W.P.W has delta waves and is a rare condition.



89. Ans. (b) Start CPR and defibrillation

Ref: Harrison 21st ed. pg. 1929

The ECG shows ventricular fibrillation. The ventricles are twitching and to re-establish the SAN dominance defibrillation will be required. Since getting an AED into action will take time, CPR must be started while other team member fixes the paddles of AED.

90. Ans. (b) Hyperkalemia

Ref: Harrison 20th ed. pg. 1829-30

- Option a is ruled out as it leads to T wave inversion and ST depression
- Option c and d leads to fluid shift across the brain and causes cerebral edema.

165. Ans. (d) Atrial depolarization

ECG finding	Significance
P wave	Atrial Depolarization
QRS	Ventricular depolarization
T wave	Ventricular repolarization
U wave	Delayed repolarization of papillary muscles
PR interval	Spread of impulse from SAN to AVN
ST segment	Iso-electric segment

166. Ans. (a) Tall tented T waves

Ref: Harrison, 19th ed. pg. 310

Serum potassium >5.5 mEq/L is associated with repolarization abnormalities:

- Peaked T waves (usually the earliest sign of hyperkalemia) **Serum potassium >6.5 mEq/L is associated with progressive paralysis of the atria.**
- P wave widens and flattens
- PR segment lengthens
- P waves eventually disappear

Serum potassium >7.0 mEq/L is associated with conduction abnormalities and bradycardia:

- Prolonged QRS interval with bizarre QRS morphology
- High-grade AV block with slow junctional and ventricular escape rhythms, followed by sine wave appearance.

Serum potassium level of >8.0–9.0 mEq/L causes cardiac arrest due to:

- Asystole
- Ventricular fibrillation

Tall tented T waves

167. Ans. (d) Treatment with steroids is necessary

- Dressler syndrome is post MI pericarditis/Pleuritis and is characterized by autoimmunity causing damage to the heart. The resultant inflammation causes chest pain in these patients upto 6 weeks of a preceding myocardial inflammation. The investigations show ECG evidence of pericarditis with ST elevation with concavity in upwards direction. The CPKMM levels are normal. The treatment of these patients shall be aspirin 650 mg TID.

Question 86

60-year-old patient presents with chest pain of 5 hours duration and collapses in ER and goes into cardiorespiratoryarrest. Which of the following is earliest to rise in myocardialinfarction? *(FMGE JULY 2024)*

a. Troponin
b. LDH1
c. Albumin
d. CKMB

169. Ans. (a) Troponin I

Ref: Harrison, 19th ed. pg. 1600

- The best test for diagnosis of MI is troponin I which can be quantified as value more than 0.04 ng/dl after 3 hours of onset of myocardial infarction.

170. Ans. (d) Warfarin

Ref: AHA 2020 update: Secondary prevention of MI

- Aspirin and clopidogrel have been shown to reduce mortality due to MI.
- Statins regress atherosclerosis and β blockers due to oxygen conserving action will prevent future episode of MI.
- Warfarin is not routinely used in post MI Patients.

171. Ans. (a) Aortic stenosis

Ref: Harrison pg. 19th ed. pg. 1529

- Reverse split S2 implies aortic valve closes very late to a level that it closes after the pulmonic valve closure (Normally aortic valve closes first and then pulmonic valve).
- ***This occurs in severe aortic stenosis*** where the valvular obstruction makes the work of left ventricle harder. The longer ejection time leads to delayed closure of aortic valve. Due to this delayed closure the split becomes narrowed
- *In mitral stenosis loud S1 is seen. In pulmonary artery hypertension loud P2 is seen. In pulmonic stenosis single S2 is seen.*

172. Ans. (d) Wide QRS complex

Ref: Harrison, 19th ed. pg. 310

ECG Findings of Hyperkalemia

- The first ECG finding in hyperkalemia is tall tented T waves followed by slowing of depolarization of heart.
- This results in prolonged PR interval with QRS widening.
- Subsequently the P waves start becoming smaller.

187. Ans. (a) CCTA

Ref: Harrison, 19th ed. pg. 270e-4

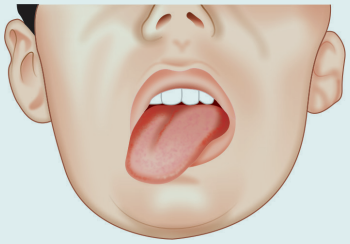
- *Coronary lesions prone to rupture* and subsequent development of MI have different morphology compared with stable plaques, and *can be evaluated by CCTA* to identify vulnerable plaques before they lead to clinical events.
- Coronary angiography is used to detect percentage of blockage in coronary artery.

NEUROLOGY

188. Ans. (b) Tongue deviation to same side

Ref: Macloed's Clinical examination, 2018 ed. pg. 133

The main feature of LMN lesion of hypoglossal nerve leads to ipsilateral deviation of tongue to the site of lesion.
In contrast the supra-nuclear lesions occur at the cerebral cortex, the corticobulbar tract of the internal capsule, cerebral peduncles, or the pons. Supranuclear lesions cause the tongue to protrude away from the nerve because of predominant neural crossing for upper motor neurons.



189. Ans. (d) Pin-point pupils

Ref: Harrison 21st ed. pg. 3637

Heat stroke occurs when there is a total loss of thermos regulatory functions. Features are tachypnea, tachycardia, hypotension and widened pulse pressure with disorientation and weakness. Sympathomimetic features will predominate and would cause pupillary dilatation.

Extra Mile

Triad of heart stroke
- Exposure to heat stress
- CNS dysfunction
- Core temperature of >40.5°C

Question 88

Patient presents with complaints of fever, headache and vomiting episodes for past 2weeks. On examination nuchal rigidity is noted with following LP report Opening pressure: elevated, Cells= PMN predominance Sugar= 35 mg/di, Protein= 105 mg/di, Color= slight cloudy appearance
Comment on appropriate diagnosis? *(FMGE JULY 2024)*

a. Meningoencephalitis
b. Viral Meningitis
c. TB meningitis
d. Bacterial meningitis

190. Ans. (a) Bacterial meningitis

Ref: Harrison 21st ed. pg. 1102

- In a clinical settting of fever with nuchal rigidity and turbid CSF showing predominantly neutrophils and low CSF sugar(normal CSF sugar= 2/3rd of Blood sugar), Acute bacterial meningitis is confirmed.
- Option b has predominant lymphocytes with straw color CSF.
- Option c has normal CSF sugar and is hence ruled out.
- Option d, Fungal meningitis occurs in patients with reduced immunity.

191. Ans. (a) Desaturation

Ref: Harrison 21st ed. pg. 3617

Question 87

18-year-old girl has lid drooping that increases with day progression.Diagnosis is? *(FMGE JULY 2024)*

a. M. Gravis
b. Fibromyalgia
c. Myotonic dystrophy
d. GBS

192. Ans. (d) M. Gravis

Ref: Harrison 21st ed. pg. 3510

- The main key word is diurnal variation of neurological symptoms with ptosis being worse in evening and relieved in morning. Ice pack test has now replaced Tensilon test to diagnose myasthenia gravis.
- Option a presents with dementia and chorea.
- Option b has gradual onset asymmetrical motor weakness developing over years and does not show any diurnal variation in symptoms.

193. Ans. (a) IV Mannitol

Ref: Harrison 21st ed. pg. 2087

The patient is having hypertensive crisis. This would require lowering of BP by 25% within minutes to 2 hours or to a BP of 160/100–110 mm Hg. This can be accomplished by Nicardipine or nitroprusside. The advantage of using esmolol is to counterbalance the reflex tachycardia that would occur in these patients. There is no role of mannitol in patients with Hypertensive emergencies.

Preferred Parenteral Drugs for Selected Hypertensive Emergencies	
Hypertensive encephalopathy	Nitroprusside, nicardipine, labetalol
Malignant hypertension (when IV therapy is indicated)	Labetalol, nicardipine, nitroprusside, enalaprilat

Contd...

- Diagnostic triad of tubercular meningitis:
  - Basal exudates

Question 89

Lumbar puncture was done in patient in sitting position and patient is having very severe headache. Which of the following is not done in patient? *(FMGE JULY 2024)*

a. Lie in supine position
b. IV caffeine
c. Restricted water intake
d. Low volume blood patch

231. Ans. (c) Caffeine

Post-lumbar puncture headache usually resolves without specific treatment:

1. Care is largely supportive with oral analgesics like acetaminophen, nonsteroidal anti-inflammatory drugs and anti emetics.
2. Patients may obtain relief by lying in a comfortable (especially a recumbent or head-down Trendelenburg) position.
3. For some patients, beverages with caffeine can provide temporary pain relief.
4. *For patients with persistent pain, treatment with IV caffeine (500 mg in 500 mL saline administered over 2 hours) is effective.*
5. Alternatively, an epidural blood patch accomplished by injection of 15 mL of autologous whole blood is usually effective.
6. Some clinicians reserve epidural blood patch for patients who do not respond to caffeine, while others prefer to use blood patch as initial management for unremitting post-LP symptoms.

232. Ans. (c) Excision with radiation

- These are highly infiltrative tumors, and the areas of increased T2/FLAIR signal surrounding the main tumor mass contain invading tumor cells.
- Treatment involves *maximal surgical resection followed by partial-field external beam radiotherapy* (6000 cGy in thirty 200-cGy fractions) with concomitant temozolomide, followed by 6–12 months of adjuvant temozolomide.

233. Ans. (a) Neurofibromatosis

NF-1 is diagnosed when *any two of the following seven signs* are present:

1. Six or more café au-lait macules. *Café au-lait spots are the hallmark of neurofibromatosis and are present in almost 100% of patients.*
2. *Axillary or inguinal freckling*[Q] consisting of multiple hyperpigmented areas 2–3 mm in diameter.
3. Two or more iris Lisch nodules. Lisch nodules are hamartomas located within the iris and are best identified by a slit-lamp examination.
4. Two or more neurofibromas or one plexiform neurofibroma.
5. Osseous lesion such as sphenoid dysplasia (which may cause pulsating exophthalmos) or cortical thinning of long bones with or without pseudoarthrosis.
6. Optic gliomas are present in ≈15% of patients with NF-1.
7. First degree relative with NF-1.

234. Ans. (d) Semi-purposive and non-repetitive, randomly distributed movements

Lesion	Manifestations	Lesion seen in
Chorea	State of *excessive*, spontaneous movements, *irregularly timed, non-repetitive*, randomly distributed and abrupt in character.	Caudate
Atheotosis	Because of the slowness, the movements have a writhing (i.e. squirming, twisting, or snakelike) appearance	Globus pallidus
Hemiballismus	Very severe form of chorea in which the movements have a *violent, flinging quality*. Ballism has been defined as "continuous, violent, coordinated involuntary activity involving the axial and proximal appendicular musculature such that the limbs are flung about.	Subthalamic nucleus

235. Ans. (a) Lateral spinothalamic tract

Important tracts

Posterior/Dorsal column	Joint position, vibration and pressure
Lateral spinothalamic tract	Pain and temperature
Ventral spinothalamic	Pressure, touch
Lateral corticospinal/ pyramidal pathways	Distal limb movements
Vestibulospinal and tectospinal tract	Axial and proximal limb movements

274. Ans. (b) Muscular hypertrophy

Please refer to above explanation

275. Ans. (b) Tongue deviation to right on protrusion

Ref: Harrison, 19th ed. Ch 367

Following a lesion of the hypoglossal nucleus or nerve

- ATROPHY of the muscles of the IPSILATERAL one-half of the tongue occurs.
- FASCICULATIONS (tiny, spontaneous contractions) can be seen.
- *Upon protrusion, the tongue will deviate TOWARD the side of the lesion (i.e., same side).* This is due to the unopposed action of the genioglossus muscle on the normally innervated side of the tongue (the genioglossus pulls the tongue forward).
- The corticobulbar input to the hypoglossal nucleus arises from motor cortex and is predominantly CROSSED. Thus, a lesion in motor cortex will result in deviation of the tongue toward the opposite side or CONTRALATERAL to the lesion.

276. Ans. (a) Acetyl choline esterase in the amniotic fluid

Ref: Nelson 18th ed. / ch. 592

- Failure of closure of the neural tube allows excretion of fetal substances (α–fetoprotein, acetylcholinesterase) into the amniotic fluid, serving as biochemical markers for a neural tube defect. Prenatal screening of maternal serum for AFP in the 16th to 18th wk of gestation is an effective method for identifying pregnancies at risk for fetuses with neural tube defects in utero.

277. Ans. (a) Tau protein

Ref: Harrison, 19th ed. pg. 172t, 175

- Pathologies and dementias of the nervous system such as Alzheimer's disease can result when *tau proteins* become defective and no longer stabilize microtubules properly.
- *Alpha synuclein protein* is seen in parkinsonism.
- *Huntington protein* is related to Huntington disease related to chromosome 4. Protein 14.3.3 is related to prion disease like variant Creutzfeldt Jakob disease.

278. Ans. (b) Thyroid ophthalmopathy

Ref: Harrison, 19th ed. pg. 2294-95

- The question is on unilateral ptosis whereas thyroid ophthalmopathy has PROPTOSIS.
- In myasthenia gravis, due to anti-Ach-receptor blocking antibodies there is ptosis which can be unilateral or asymmetrical which will again appear unilateral.
- Marfan syndrome has congenital Ptosis.
- Pancoast tumor causes horner syndrome in which unilateral sympathetic chain is compressed leading to Ptosis, Miosis, Anhidrosis, Enophthalmos and loss of Cilio-spinal reflex.

279. Ans. (a) Uncal herniation

Ref: Harrison, 19th ed. pg. 1772

- In uncal or mid brain herniation, the raised ICT

Question 90

30-year-old woman presents with generalized muscle weakness, ptosis and double vision that worsens with activity and improves on rest. She has difficulty in chewing and swallowing in evening hours. Tensilon test shows improvement in muscle power. Which of the following is best to confirm her diagnosis? *(FMGE JULY 2024)*

a. CT chest
b. SFEMG
c. Anti Ach R antibody
d. NCV

281. Ans. (a) Single Fiber E.M.G

Ref: Harrison, 19th ed. pg. 442e-6

- *Single fiber E.M.G is the investigation of choice* for myasthenia gravis and shows a decremental response
- Antiacetylcholine receptor blocking antibody TITER is the most specific test for diagnosis of myasthenia gravis. Also remember that *Tensilon test is a screening test* for myasthenia gravis. False positive tensilon test can be seen in motor neuron disease.

282. Ans. (b) Subarachnoid granulations

Ref: Harrison, 19th ed. pg. 443e-4

- *CSF is produced by the choroid villi* in the lateral ventricles and third ventricles. The CSF flows via aqueduct of slyvius to the 3rd ventricle and then via foramen of Munro to the 4th ventricle. The CSF emerges out of Foramen of Luschka and Magendie and accumulates at the base of the skull in basal cisterns.
- *This CSF is then reabsorbed via the arachnoid granulations back into the blood stream.*
- The CSF is produced at a rate of 20 mL per hour and reabsorbed at the same rate. The total amount of CSF at any point of time is 150 mL.

283. Ans. (d) Nystagmus

Ref: Harrison, 19th ed. pg. 2608

- In contrast glycosylated hemoglobin gives fluctuations in blood sugar value over the previous 6-8 weeks.
- **Also remember:** Severity of bronze diabetes is determined by GLYCATED albumin.

351. Ans. (c) <180 mg/dL

Ref: Harrison, 18th ed. ch. 344

TABLE: Treatment goal for adults with diabetes

Parameters	Goal
HbA1C	<7%
Preprandial capillary plasma glucose	70–130 mg/dL
Peak post prandial capillary plasma glucose	<180 mg/dL
Blood pressure	<130/80
LIPIDS	
LDL	<70 mg/dL
HDL	>40 mg/dL in men >50 mg/dL in women
Triglycerides	<150 mg/dL

352. Ans. (b) Dilutional hyponatremia

Ref: Harrison, 19th ed. pg. 303-304

- Diabetes insipidus has either low levels of vasopressin or it is not able to act. Therefore these patients pass a large amount of dilute urine(Polyuria and resultant polydipsia develops). The result is that due to loss of water from body these patients will develop relative hypernatremia.
- ***The diagnostic test is water deprivation test***

Drugs

- NEUROGENIC diabetes inspidus is treated with desmopressin nasal spray.
- Nephrogenic diabetes inspidus is treated with thiazide diuretics.
- **Remember:** Dilutional hyponatremia is seen with S.I.A.D.H.

353. Ans. (c) Relative hypernatremia

Ref: Harrison 19th ed. pg. 2280

- SIADH is characterized by gain of water and hence dilutional hyponatremia sets in. The gain of water explains low uric acid.
- Since in SAIDH most of the water is reabsorbed via the CD, the low urine output prompts a physician to possibility of renal parenchymal disorder for which KFT must be done and must be normal to consider diagnostic possibility of SIADH.

354. Ans. (a) Insulinoma

Ref: Harrison, 19th ed. pg. 569

Question 91

Which is not correct about Carcinoid tumor?

(FMGE JULY 2024)

a. Urinary 5 HIAA is normal
b. Flushing
c. Asthma
d. Tricuspid regurgitation

355. Ans. (a) 24-hour urinary 5H.I.A.A.

Ref: Harrison, 19th ed. pg. 564-65

- **5-HIAA is the major urinary metabolite of serotonin, a ubiquitous bioactive amine.** Serotonin, and consequently 5-HIAA, are produced in excess by most carcinoid tumors, especially those producing the carcinoid syndrome of flushing, hepatomegaly, diarrhea, bronchospasm, and heart disease.

356. Ans. (b) Serotonin

Ref: Harrison, 19th ed. pg. 564-65

- Argentaffin cells in Carcinoid produce 5HT derivatives like serotonin. Epinephrine and norepinephrine are produced by chromaffin cells which are seen in phaeochromocytoma.

357. Ans. (c) TSH

Ref: Harrison, 19th ed. pg. 2289

- Best test for diagnosis of hypothyroidism is T.S.H (Thyroid Stimulating Hormone).
- TSH can also be used for monitoring response to treatment.

358. Ans. (b) Excessive iodine

Ref: Harrison, 19th ed. pg. 2285, 2297

- Excess iodide transiently inhibits thyroid iodide organification, a phenomenon known as the *Wolff-Chaikoff effect.*
- Thyroid hormone synthesis becomes excessive as a result of increased iodine exposure (Jod-Basedow phenomenon which is opposite of Wolf Chaikoff effect.)
- Iodine deficiency increases thyroid blood flow and upregulates the iodine trapping, stimulating more efficient iodine uptake.
- Ingestion of excess thyroid hormone or thyroid tissue is known as thyrotoxicosis factitia. In the first and second statements of this explanation iodine intake was affected but in Throtoxicosis factitia is due to the ingestion of hormone.

- Diagnostic triad of tubercular meningitis:
  - Basal exudates
  - Infarcts
  - Hydrocephalus

Must know points for tubercular meningitis

- The combination of unrelenting headache, stiff neck, fatigue, night sweats, and fever with a *CSF lymphocytic pleocytosis and a mildly decreased glucose concentration* is highly suspicious for tuberculous meningitis.
- If there is a pellicle in the CSF or a *cobweb-like clot* on the surface of the fluid, AFB can best be demonstrated in a smear of the clot or pellicle

231. Ans. (c) Caffeine

Post-lumbar puncture headache usually resolves without specific treatment:

1. Care is largely supportive with oral analgesics like acetaminophen, nonsteroidal anti-inflammatory drugs and anti emetics.
2. Patients may obtain relief by lying in a comfortable (especially a recumbent or head-down Trendelenburg) position.
3. For some patients, beverages with caffeine can provide temporary pain relief.
4. *For patients with persistent pain, treatment with IV caffeine (500 mg in 500 mL saline administered over 2 hours) is effective.*
5. Alternatively, an epidural blood patch accomplished by injection of 15 mL of autologous whole blood is usually effective.
6. Some clinicians reserve epidural blood patch for patients who do not respond to caffeine, while others prefer to use blood patch as initial management for unremitting post-LP symptoms.

232. Ans. (c) Excision with radiation

Question 92

Patient presents neurofibromas, cafe au lait spots and lisch nodules *(FMGE JULY 2024)*

a. NF2
b. NF1
c. TSC1
d. TSC2

233. Ans. (a) Neurofibromatosis

NF-1 is diagnosed when *any two of the following seven signs* are present:

1. Six or more café au-lait macules. *Café au-lait spots are the hallmark of neurofibromatosis and are present in almost 100% of patients.*
2. *Axillary or inguinal freckling*[Q] consisting of multiple hyperpigmented areas 2–3 mm in diameter.
3. Two or more iris Lisch nodules. Lisch nodules are hamartomas located within the iris and are best identified by a slit-lamp examination.
4. Two or more neurofibromas or one plexiform neurofibroma.
5. Osseous lesion such as sphenoid dysplasia (which may cause pulsating exophthalmos) or cortical thinning of long bones with or without pseudoarthrosis.
6. Optic gliomas are present in ≈15% of patients with NF-1.
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Hemiballismus	Very severe form of chorea in which the movements have a *violent, flinging quality*. Ballism has been defined as "continuous, violent, coordinated involuntary activity involving the axial and proximal appendicular musculature such that the limbs are flung about.	Subthalamic nucleus

235. Ans. (a) Lateral spinothalamic tract

Important tracts

Posterior/Dorsal column	Joint position, vibration and pressure
Lateral spinothalamic tract	Pain and temperature
Ventral spinothalamic	Pressure, touch
Lateral corticospinal/ pyramidal pathways	Distal limb movements
Vestibulospinal and tectospinal tract	Axial and proximal limb movements

Question 93

In a patient with dyslipidaemia, is on Atorvastatin. Which of the following drug will be added to increase the HDL level: *(FMGE JULY 2024)*

a. Niacin
b. Folic acid
c. Vit B6
d. Lactulose

142. Ans. (a) Fibrates

Ref: Harrison, 19th ed. pg. 2449

- The *fibrates, or fibric acid derivatives*, act in part to stimulate the activity of peroxisome proliferator-activated receptors (PPARs), which are involved in fatty acid breakdown. *The main action of fibrates is to lower triglyceride levels (by 35 to 50 percent). Fibrates also raise serum high density lipoprotein (HDL) by 15 to 25 percent. Fibrates are the drugs of choice when treating isolated elevated triglycerides.*
- *Niacin*, fibrates, and prescription omega-3 fatty acids are approved for the treatment of patients with hypertriglyceridemia.
- *Statins* (or HMG-CoA reductase inhibitors) are a class of cholesterol lowering drugs that inhibit the enzyme HMG-CoA reductase which plays a central role in the production of cholesterol.
- *Ezetimibe* inhibits the absorption of cholesterol from the small intestine and decreases the amount of cholesterol normally available to liver cells, leading them to absorb more from circulation and thus lowering levels of circulating cholesterol.

143. Ans. (d) Platypnea

Ref: Harrison, 19th ed. pg. 1992

- Platypnea-orthodeoxia is a striking clinical syndrome characterized by *dyspnea and deoxygenation accompanying a change to a sitting or standing from a recumbent position.*
- In orthopnea (reverse findings are seen) the dysnea is seen in supine position and reduces in sitting position. It is usually due to acute CHF and bilateral diaphragmatic hernia.

Causes of Platypnea

- ASD or PFO with position-dependent shunting
- Other Cardiac conditions
  - Atrial Myxoma[Q]
  - Constrictive pericarditis
  - Aortic aneurysm
- Pulmonary
  - Multiple pulmonary emboli
  - Pulmonary emphysema
  - Radiation-induced bronchial stenosis
  - Hepatopulmonary syndrome[Q]
  - Amiodarone toxicity of the lungs
  - Pulmonary A-V communications
  - Fat embolism syndrome

144. Ans. (b) Cardiac Biomarkers

Ref: Harrison, 19th ed. pg. 1580

- The cardiac troponins, are elevated in case of NSTEMI.
- However in chronic Stable angina the symptoms arise on exertion/emotion or post-prandially and have characteristic ST segment depression on exercise testing. Cardiac biomarkers are *normal* as no cell death occurs in this case.

145. Ans. (a) Aortic regurgitation

Ref: Harrison, 19th ed. pg. 411

Duroziez's sign is seen in severe aortic regurgitation, *gradual pressure over the femoral artery leads to a systolic and diastolic bruit*. The systolic murmur is heard best when the proximal femoral artery is compressed and the diastolic when the distal femoral artery is compressed.

146. Ans. (c) Erythema Marginatum

Ref: Harrison, 19th ed. pg. 2149

Morning stiffness is seen in Rheumatoid arthritis, while the question is on Rheumatic fever. Erythema Marginatum is a major Jones criteria for diagnosis of Rheumatic Fever.

Revised Jones criteria (2015 update)

A. Diagnosis

For all patient populations with evidence of preceding gas infection
Initial ARF – 2 Major or 1 major plus 2 minor
Recurrent ARF- 2 Major or 1 major and 2 minor or 3 minor

B. What are major criteria?

Low-risk populations	Moderate-and high-risk population
• Carditis ▪ Clinical and/or subclinical carditis	• Carditis ▪ Clinical and/or subclinical carditis
• Arthritis ▪ Polyarthritis only	• Arthritis ▪ Monoarthritis or polyarthritis ▪ Polyarthralgia
• Chorea	• Chorea
• Erythema marginatum	• Erythema marginatum
• Subcutaneous nodules	• Subcutaneous nodules

C. What are the minor criteria

Low-risk populations	Moderate-and high-risk population
• Polyarthraigia	• Monoarthralgia
• Fever (≥38.5°)	• Fever (≥38°C)
• **ESR≥60 mm** in 1st hour and/or CRP ≥3.0 mg/d	• **ESR≥30** mm/h and /or CRP ≥3.0

- Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion) in all population

To differentiate between exudative and transudative pleural effusion, the following criteria known as *Light's criteria* is used:

1. Pleural fluid protein/serum protein >0.5
2. Pleural fluid LDH/Serum LDH >0.6
3. Pleural fluid LDH more than 2/3rd the upper normal limit for serum

Exudative pleural effusion meets at least one of the given criteria while transudative meets none.

535. Ans. (a) Chronic bronchitis

Ref: Harrison 19th ed. 1701

- Chronic obstructive airway disease leads to development of damage to ciliated columnar epithelium. The resultant stasis promotes low grade infection leading to bronchorrhea. This manifestation is called chronic bronchitis.
- Follicular bronchiolitis is due to hyperplasia of bronchial associated lymphoid tissue (BALT) seen due to collagen vascular disease and immune deficiency states. It mainly involves the lower lobes of lung.
- Desquamative pneumonitis is interstitial lung disease in smokers. It leads to development of pulmonary fibrosis.
- Chemical pneumonitis is due to aspiration of stomach acid and is also known as Mendelson syndrome.

536. Ans. (c) Albumin

- Pleural effusion in TB could be a presentation of primary TB due to sub-pleural location of Gohn's focus or can present as extra-pulmonary TB.
- Gene XPERT is a nucleic acid amplification based test which in a matter of few hours can tell if MTB is present and can also determine resistance.
- The values of LDH are taken in Light's criteria for pleural effusion to determine exudative nature of the fluid
- Adenosine deaminase has 90% sensitivity and 92 % specificity for determining the tubercular nature of fluid.
- The question is based on common sense that albumin values in serum and ascitic fluid are evaluated in patients of ascites.

537. Ans. (a) A.T.T

The CXR shows a miliary picture and ATT must be initiated. Since the child is malnourished and is having Miliary TB, his cell mediated immunity is already reduced. Hence steroids would be contraindicated in this case. The antibiotics would be useful in bacterial pneumonia which is ruled out due to radiological picture.

538. Ans. (d) Lung

Ref: Wintrobe's Clinical Hematology, 13th ed. pg. 1583

- It is seen with hyperleucocytosis with WBC count > 10^5/cu. mm. *Leukostasis affects pulmonary and brain circulation*. The presence of dysnea, tachypnea, lethargy and slurred speech is characteristic.

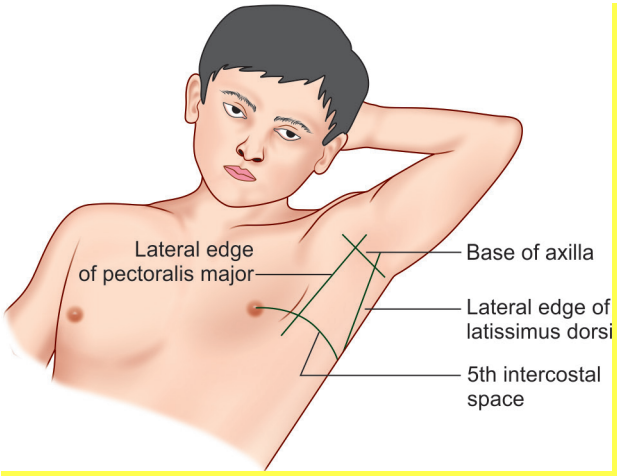
Question 94

A patient following a road traffic accident presented with subcutaneous emphysema. On auscultation, there was no air entry on the right side. Vitals were unstable. What will be your immediate management? *(FMGE JULY 2024)*

a. Insertion of wide bore needle in the 5th intercostal space
b. Wide bore needle decompression and IV fluids
c. Intubation and positive pressure ventilation
d. eFAST

539. Ans. (c) 5th midaxillary space

- The 5th intercostal space in the mid-axillary line is generally used for most situations. This area is commonly known as the "safe triangle", bordered by the anterior border of latissimus dorsi, the lateral border of the pectoralis major, a line superior to the horizontal level of the nipple and an apex below the axilla.



540. Ans. (c) ARDS

Shock Lung/ ARDS is a clinical syndrome caused by diffuse alveolar capillary and epithelial damage. There is usually rapid onset of life-threatening respiratory insufficiency, cyanosis, and severe arterial hypoxemia that is refractory to oxygen therapy and that may progress to multisystem organ failure. The histologic manifestation of ARDS in the lungs is known as *diffuse alveolar damage.*

541. Ans. (a) Staphylococcus aureus

- *S. aureus* is a cause of serious respiratory tract infections in newborns and infants; these infections present as shortness of breath, fever, and respiratory failure.
- Chest X-ray may reveal pneumatoceles (shaggy, thin-walled cavities). Pneumothorax and empyema are recognized complications of this infection.

542. Ans (c) Levofloxacin

Ref: Harrison, 20th ed. pg. 963

Empirical Antibiotic Treatment of Health Care-Associated Pneumonia

The antibiotics recommended with no risk factors for gram negative pathogens are Piperacillin/tazobactam cefepime or levofloxacin

543. Ans. (d) Fat embolism

- In the clinical setting of fracture of long bone and subsequent respiratory distress and development of petechiae satisfies GURD criteria for diagnosis of fat embolism.

The criteria for diagnosing fat embolism are as follows:

Major criteria

- Symptoms and radiologic evidence of respiratory insufficiency
- Cerebral sequelae unrelated to head injury or other conditions
- Petechial rash

Minor criteria are as follows:

- Tachycardia (heart rate >110 beats/min)
- Pyrexia (temperature >38.5°C)
- Retinal changes of fat or petechiae
- Renal dysfunction
- Jaundice
- Acute drop in hemoglobin level
- Sudden thrombocytopenia
- Elevated erythrocyte sedimentation rate
- Fat microglobulinemia

544. Ans. (d) Lesion in the brain

Biot's Breathing: Biot's Breathing is characterized by irregularly irregular breathing with sudden apnea and is seen in CNS lesions and is a sign of increased intracranial pressure.

Kussmaul's Respiration. Kussmaul Breathing is deep rapid respiration in metabolic acidosis and is classically associated with diabetic ketoacidosis

Cheyne-Stokes Respiration. Cheyne-Stokes Respiration is one of increasingly deep respiration followed by a steady diminution of breathing until an apneic episode occurs in neurologic diseases with raised ICP. Obesity may be present. Some patients will show pupillary dilation with rapid breathing and pupillary contraction with apnea.

Contd...

The differential diagnoses are

- CNS disease
- CHF
- Pneumonia
- Carbon monoxide poisoning
- Medications (e.g., morphine).

Apneustic Breathing. Apneustic breathing is seen in severely ill patients with coma. The patient holds his or her breath at the end of inspiration until the Hering-Breuer (carotid body) reflex initiates exhalation. This breathing pattern suggests pontine disease.

545. Ans. (d) CT with IV contrast

Ref: Harrison, 19th ed. pg. 1633-64

- A definitive diagnosis of PE depends on visualization of an intraluminal filling defect in more than one projection.
- *Chest CT with contrast has become the main test for diagnosis replacing the older invasive pulmonary angiography.*
- Catheter-based diagnostic testing is used in case of an unsatisfactory chest CT and those patients where catheter-directed thrombolysis or embolectomy is planned.

546. Ans. (a) Narcotic over-dosage

- Narcotics cause CNS depression and lead to inability of respiratory centre to respond to increasing carbon dioxide levels.
- Abnormalities of central respiratory drive and reduced

Question 95

A 28 year old HIV positive patient was complaining of cough, fever and tachypnea. His chest X-Ray shows B/L infiltration and CD4 count was below 200. What is the likely diagnosis in this case and what drug will you prescribe to him? *(FMGE JULY 2024)*

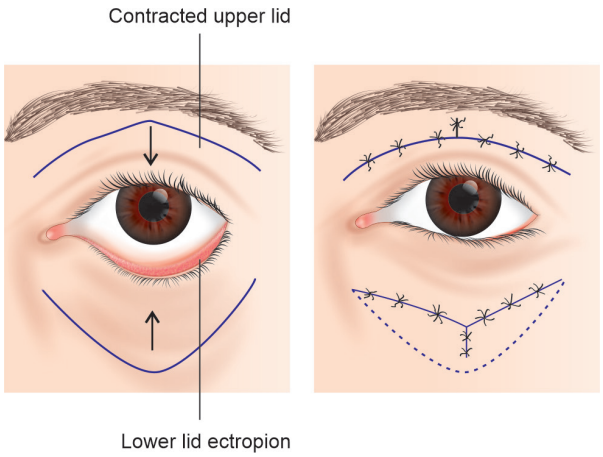
a. Pneumocystis carinii, cotrimoxazole
b. Toxoplasma gondii, TMP-SMX
c. Aspergillus, Albendazole
d. Candida, fluconazole

547. Ans. (d) Sulfomethoxazole and trimethoprim

Ref: Harrison, 19th ed. pg. 492

- Prophylaxis with trimethoprim-sulfamethoxazole prevents many opportunistic infections, including infection with *P. carinii, Toxoplasma gondii,* and community-acquired respiratory, gastrointestinal, and urinary tract pathogens.
- Intolerance of TMP-SMZ is common; desensitization is useful less often in transplant patients than in patients with AIDS.

FMGE SOLUTIONS



26. Ans. (a) Social blindness

Ref: A.K. Khurana, 7th ed. pg. 73

Question 96

How does the World Health Organization (WHO) define blindness? *(FMGE JULY 2024)*

a. VA < 3/60
b. VA < 6/60
c. VA >3/60
d. VA 6> 6/60

Definitions of blindness:

- **Total blindness:** Ophthalmology, Absolute (No light perception)
- **Legal blindness:** Vision in better eye <1/60 to perception light
- **Social blindness:** WHO, NPCBVI (vision in better eye <3/60 to 1/60)
- **Economic blindness:** Severe VI, work (Vision in better eye <6/60 to 3/60
- Moderate visual impairment

27. Ans. (c) Goldmann applanation tonometer

Ref: A.K. Khurana, 7th ed. pg. 530

- Goldman applanation tonometry is considered as gold standard for measuring IOP.

28. Ans. (c) Can be used in cases of hazy ocular media

Ref: A.K. Khurana, 7th ed. pg. 607

- The shown image is of direct ophthalmoscopy. It produces an Erect image (upright) and magnification 15 times.
- In hazy ocular media it cannot be used.

Extra Mile

Features	Direct ophthalmoscopy	indirect ophthalmoscopy
Condensing lens	Not Required	Required
Examination distance	As close to patient's eye as possible	At an arm's length
Image	Virtual, erect	Real, inverted
Illumination	Not as bright; not useful in hazy media	Bright; useful for hazy media
Area of field in focus	About 2 disc diameters	About 8 disc diameters
Stereopsis	Absent	Present
Accessible fundus view	Slightly beyond equator	Up to Oral serrata i.e. peripheral retina
Examination through hazy media	Not possible	Possible

29. Ans. (b) Schirmer's test

Ref: Khurana 7th ed. pg. 407

- Schirmer's test is used to measures total tear secretions.
- This test is used in dry eye disease.
- It is performed with the help of a 5 × 35 mm strip of Whatman-41 filter paper.

Procedure

- This paper is folded 5 mm from one end and place it in the lower fornix at the junction of lateral one-third and medial two-thirds.
- Then patient is asked to look up and not to blink or close the eyes.
- After 5 minutes wetting of the filter paper take place from the bent end then its reading is measured.
- Interpretation of Schirmer-I test -
  - More than 15 mm = Normal value
  - Value of 5-10 mm = Moderate to mild keratoconjunctivitis sicca (KCS).
  - Value less than 5 mm = severe KCS.

30. Ans. (d) Ames test

Ref: A.K. Khurana, 6th ed. pg. 330-331

42. Ans. (b) Its nucleus is located in lower midbrain

Ref: A.K. Khurana, 6th ed. pg. 7-8

- Location of **CN III** (oculomotor nerve) nucleus is **upper midbrain**
- Location of **CN IV** (trochlear nerve) nucleus is in the **lower mid-brain**.

TABLE: CN, their Respective Nucleus Location and their Function

Cranial Nerve	Nucleus Location	Function
Oculomotor III	Upper midbrain	Eyeball movements: extrinsic ocular muscles
Trochlear IV	Lower midbrain	Eyeball movements: extrinsic ocular muscles
Abducens VI	Pons	Eyeball movements: extrinsic ocular muscles
Hypoglossal XII	Medulla	Tongue muscles and movements

43. Ans. (b) Lacrimal gland

Ref: A.K. Khurana, 6th ed. pg. 386

GLANDS OF EYELIDS

- **Meibomian glands**: Also known as tarsal glands present in the stroma of tarsal plate and are arranged vertically.
  - They are modified sebaceous glands. Their ducts open at the lid margin. Their secretion constitutes the oily layer of tear film.
- **Glands of Zeis**: These are also sebaceous glands which

Question 97

Patient has a lateral rectus palsy how would you confirm this *(FMGE JULY 2024)*

a.
b.
c.
d.

44. Ans. (a) Superior oblique

Ref: A.K. Khurana, 6th ed. pg. 337-39

- The function of superior oblique is quite contrary to its name. Its action is depression of eyeball, which helps to see down.
- Its yoke muscle is inferior rectus, which also has the similar function as superior oblique. If superior oblique is affected patient will develop difficulty in looking down
- There are 9 Gaze:
  - Primary : Straight
  - Secondary: Up, down, left, right
  - Tertiary : Up left, Up, right, Down left, Down right
- **ACTIONS OF EOM**

Muscle	Function		
	Primary	Secondary	Tertiary
Lateral rectus	Abduction	–	–
Medial Rectus	Adduction	–	–
Inferior Rectus	Depression	Extorsion	Adduction
Superior rectus	Elevation	Intorsion	Adduction
Inferior Oblique	Extorsion	Elevation	Abduction
Superior oblique	Intorsion	Depression	Abduction

- **Mnemonics:** *SinRad (all superior muscles causes Intorsion; all rectus muscles causes Adduction EXCEPT Lateral rectus)*

45. Ans. (a) Adduction and intorsion

Ref: A.K. Khurana, 6th ed. pg. 339

46. Ans. (b) Inferior rectus

Ref: A.K. Khurana, 6th ed. pg. 337-39

- The function of inferior rectus is depression of eyeball, which helps to see down.
- Its yoke muscle is superior oblique, which also has the similar function as inferior rectus.

47. Ans. (c) Towards the right side

Ref: A.K. Khurana, 6th ed. pg. 337-39

- ***VIth nerve palsy leads to l***oss of abduction/lateral gaze leading to **abnormal head posture towards the side** of affected muscle
- ***There is*** Presence of ***convergent squint also.***

Extra Mile

IVth nerve palsy
- Diplopia on looking down
- Inability to look inferomedially

48. Ans. (d) Right superior rectus

Ref: A.K. Khurana, 6th ed. pg. 339

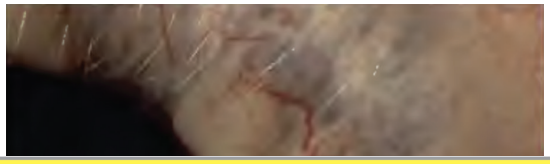
- **Synergistic muscle** is two muscles *functioning as same, in the same eye*. Function of superior rectus is to elevate the eye, which is same with inferior oblique.
  - Right inferior oblique and right superior rectus elevate the right eye
- Yoke muscle on the contrary, is two extraocular muscles from two eyes having same function.
  - **Ex:** Yoke muscle of right inferior oblique is left superior rectus.

CORNEA, CONJUNCTIVA AND SCLERA

66. Ans. (a) Iris

Ref: Kanski Clinical Ophthalmology, 9th ed. pg. 427

- Koeppe nodules are inflammatory cell precipitates and could be found in non-granulomaous as well as granulomatous uveitis
- Koeppe nodules are located on the pupillary margin of iris and may be the site of posterior synechiae formation.



Question 98

Vitamin A deficiency is associated with *(FMGE JULY 2024)*

a. Pinguecula
b. Bitot spots
c. Pterygium
d. Stockers line

67. Ans. (a) Vitamin A

Ref: Kanski Clinical Ophthalmology, 9th ed. pg. 247

- Bitot's spots are typically dry-appearing triangular patches of xerosed conjunctiva with a layer of foam on the surface, usually located temporal to the cornea.
- They mainly composed of keratin admixture with gas-forming bacteria Corynebacterium xerosis, lead to foamy appearance.
- **Bitot's spots** are characteristic of Vitamin A deficiency and are not caused by any other condition.

68. Ans. (c) Giant papillary conjunctivitis

Ref: A.K. Khurana, 7th ed. pg. 84

- **Giant papillary conjunctivitis** also known as mechanically induced papillary conjunctivitis is a localized allergic response to a physically rough or deposited surface like contact lens, prosthesis, exposed nylon sutures and scleral buckle.
- It mostly presents with foreign body sensation, itching and congestion. There is associated multiple small papillae development inside of the eyelid.

69. Ans. (b) Satellite lesions

Ref: A.K. Khurana, 7th ed. pg. 117

- The given condition is of fungal keratitis. It is mostly seen among farmers.
- **MC organism:** Fusarium, Aspergillus
- Patient present with photophobia, discharge, redness, blurred vision, excessive tearing
- Upon examination: satellite lesion is seen.
- **HPE**: organism is seen as Filamentary fungi, the corneal lesions have a whitish gray infiltrate with feathery border.

70. Ans. (b) Vernal keratoconjunctivitis

Ref: A.K. Khurana, 7th ed. pg. 80

- VKC is recurrent, bilateral, chronic with exacerbations and characteristic white ROPY discharge with intense itching usually in the spring season of summer. This condition is often termed as spring catarrh.

71. Ans. (a) Fungal keratitis

Ref: A.K. Khurana, 7th ed. pg. 109

- The given case is of fungal ulcer.
- Mycotic ulcer is caused when a person gets injured by vegetative material such as crop leaf, branch of tree, straw thorn etc

Other modes of injury:

- Injury by animal tail
  - Secondary fungal ulcer

72. Ans. (a) Anterior staphyloma

Ref: A.K. Khurana, 7th ed. pg. 138

- The shown condition is anterior staphyloma
- It is a localized defect in the anterior eye wall with protrusion of uveal tissue due to alterations in scleral thickness and structure.

73. Ans. (d) Mitomycin C

Ref: A.K. Khurana, 7th ed. pg. 89

- Patients with recurrent pterygia suffer from blurred vision because of the astigmatism.
- Various surgical procedures have been proposed:
  - Conjunctival autografting
  - Conjunctival limbal autografting
  - Amniotic membrane transplantation
  - Application of mitomycin C

Extra Mile

Clinical uses of Mitomycin C in Ophthalmology

- Pterygium surgery
- Glaucoma filtering surgery
- Refractive surgeries
- Ocular surface tumors
- Squint surgeries
- Dacryocystorhinostomy (DCR)
- Allergic conjunctivitis

subretinal fluid accumulation retinal detachment are of following types:

- Exudative retinal detachment
- Tractional retinal detachment
- Rhegmatogenous retinal detachment

Exudative retinal detachment: Lesions of retinal pigment epithelium. **Commonest causes are:**

- **Malignant melanoma of choroid**
- ***Followed by pregnancy induce hypertension, 140/90 after 20th week of gestation.***
- Malignant hypertension 200/120 end stage hypertension.

TRACTIONAL RETINAL DETACHMENT

- Caused by mechanical traction (progressive contraction) of fibrovascular membrenes over large areas of vitreoretinal adhesion. *Characterized by slow painless loss of vision* (only retinal detachment that is slow). Causes are:

Question 99

Sudden loss of vision with no fundal glow, there is no history of trauma. *(FMGE JULY 2024)*

a. Vitreous Haemorrhage
b. optic atrophy
c. AAU
d. ACG

separating it from retinal pigment epithelium.

- The predisposing conditions of **rhegmatogenous retinal detachment** are **Myopia**, previous intraocular surgery such as **aphakia** or pseudophakia, a family history of retinal detachment, **trauma** and inflammation.

VITREOUS HEMORRHAGE

- Vitreous hemorrhage is not a (clinical) feature of retinal detachment. *Characterised by sudden painless loss of vision; floaters, no flashing of light.* **Causes are:**
  - **Diabetic retinopathy: Most common cause**
  - In young patient most common cause is Trauma and Eale's disease.

176. Ans. (a) Exudative retinal detachment

Ref: A.K. Khurana, 6th ed. pg. 273, 299

177. Ans. (b) Diabetic retinopathy

Ref: A.K. Khurana, 6th ed. pg. 273, 299; Parson's Ophthalmology 20/312

178. Ans. (d) CRVO

Ref: A.K. Khurana, 6th ed. pg. 269, 431

Question 100

Cherry red spot in seen in ? *(FMGE JULY 2024)*

a. Tay sachs disease
b. Gaucher disease
c. Fabry disease
d. Galactosemia

Cherry Red Spot of Retina is seen in—

- CRAO
- Trauma (Blunt trauma, Berlin's edema)
- Neimann pick disease
- Gaucher's disease
- Tay – Sach's disease
- Sand hoff's disease

Mnemonic: Cherry Tree Never Grow Tall in Sand.

179. Ans. (c) Central retinal vein occlusion

Ref: A.K. Khurana, 6th ed. pg. 214, 271, 294

CYSTOID MACULAR EDEMA (CME)

- Collection of fluid in the **outer plexiform (Henle's layer) a nuclear layer** of the retina is called CME.
- It is associated with Central Retinal Vein Occlusion/ post operative complication of cataract extraction and penetrating keratoplasty/diabetic retinopathy/Retinitis pigmentosa
- Minimal to moderate loss of vision is seen.
- It is **best examined with slit lamp/+90D** lens
- Ophthalmoscopy shows **"honeycomb appearance" of macula.**
- Fundus flurorescein angiography shows **"flowerpetal appearance".**
- Treatment of underlying primary cause and drugs (topical steroids triamcinofone/topical NSAIDs like flurbiprofen) is beneficial.

Extra Mile

- **100 day glaucoma'** is seen with CRVO
- **CATTLE TRUCK** appearance seen with CRAO
- IRVIN GASS SYNDROME is seen with post cataract CME

180. Ans. (a) Sarcoidosis

SARCOIDOSIS

- Sarcoidosis is a granulomatous disease of unknown etiology.
- It occurs most frequently in young adults (20 to 40 years), has a predilection for women.
- Around 20% patients with sarcoidosis has ocular involvement.
- **The most prevalent ocular sign** is unilateral, anterior, granulomatous uveitis.
- The common clinical ocular findings associated with sarcoid uveitis include:
  - Decreased or hazy vision, pain, photophobia, lacrimation, conjunctival injection, cells and flare in the anterior chamber, granulomatous iritis with large *"mutton fat"* keratic precipitates scattered over

- CN III palsy leads to drooping of eyelid (Ptosis).
- CN VII palsy may also cause ptosis.

Extra Mile

- All the extraocular muscles are supplied by CN III except lateral rectus and superior oblique.
- Lateral rectus supplied by—CN VI
- Superior oblique supplied by—CN IV

Remember: LR6, SO4; all other by CN III

LENS/CATARACT

201. Ans. (a) Myopic shift

Ref: Kanski Clinical Ophthalmology, 9th ed. pg. 319

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6174295/

- The major postoperative refractive error at the follow-up is myopia. Thus, it is important to adjust the IOL calculation formula to specify more undercorrection, with the aim of achieving more optimal refractive outcomes in adulthood.
- Based on guidelines, the under corrected IOL power was calculated by anticipating the expected myopic shift.

Under correction:

- By 20% if the age is <2 years
- By 10% if the age is <8 years
- Full correction after 8 years, because of emmetropia

202. Ans. (b) Acanthamoeba

Ref: Kanski Clinical Ophthalmology, 9th ed. pg. 232

Question 101

What type of cataract is associated with blunt trauma?

a. Rosette cataract *(FMGE JULY 2024)*
b. Christmas tree
c. Snowflake
d. Sunflower cataract

203. Ans. (a) Rosette cataract

Ref: A.K. Khurana, 7th ed. pg. 448

- **Rossette Shaped Cataract** is a posterior subcapsular developed due to minute ruptures in lens capsule with influx of aqueous leading to opacification.
- It is caused due to blunt trauma

204. Ans. (b) Buphthalmos

At present, the term "buphthalmos" is used to describe the visible enlargement of the eyeball detected at birth or soon after, due to any uncontrolled glaucoma in early childhood.

Clinical features of Buphthalmos:

- Tearing
- Sensitivity to light
- Eye irritation
- Haziness in the eye

205. Ans. (c) Posterior subcapsular cataract

Ref: A.K. Khurana, 7th ed. pg. 189

- The shown image is of Posterior Subcapsular Cataract (PSC). There is formation of granular or plaque like opacity in the posterior subcapsular cortex.
- PSC causes maximum visual disability due to its location at/near the NODAL POINT of the eye.
- **Clinical feature:**
  - Loss of near vision more than far vision
  - Vision improves in dim illumination
  - Glare

206. Ans. (c) Trauma

Ref: Khurana 7th ed. pg. 527, 448

- Rosette-shaped cataract, early as well as late, is typical of concussion injury of lens.
- Rosette cataract is a complication of blunt trauma.
- **Early rosette:** Feathery lines of opacities along the star-shaped suture lines, usually in the posterior cortex.
- **Late rosette:** Develops in the posterior cortex l to 2 years after the injury.
- Sutural extensions are shorter and more compact than the early rosette cataract.

- The commonly used applanation tonometer are:
  - Goldmann tonometer—it is the most popular and accurate tonometer, consists of a double prism mounted on a standard slit-lamp. The prism applanates the cornea in an area of 3.06 mm diameter.

236. Ans. (a) Glaucoma

Ref: Comprehensive Ophthalmology by A.K. Khurana, 7th ed. pg. 470

- Topical beta-blockers have long been the mainstay of open-angle glaucoma therapy.
- When an individual is already using systemic beta-blockers, the response to topical beta-blockers is often not optimal.
- Preferred beta blocker in OAG: Timolol
- Preferred beta blocker in patients with history of bronchial asthma: Betaxolol.

237. Ans. (a) Intumescent cataract

Ref: A.K. Khurana, 6th ed. pg. 193, 248

- Phacomorphic glaucoma is most common lens induced glaucoma (secondary ACG).
- It is caused due to intumescent/swollen, cataractous lens.
- The swollen lens pushes the iris forward resulting in secondary ACG.

238. Ans. (d) Dorzolamide

Ref: Katzung Pharmacology; 11/ed. pg. 89

- **Timolol:** Beta blocker. Decreases aqueous secretion from ciliary epithelium. DOC for POAG in India.

Question 102

What could be the cause of acute sudden painful dimunition of vision with vertically oval pupil? *(FMGE JULY 2024)*

a. Angle closure glaucoma
b. Optic neuritis
C. CSR
d. Cataract

239. Ans. (c) Angle closure glaucoma

Ref: A.K. Khurana, 6th ed. pg. 239-40

- In case of angle closure glaucoma, pupil is mid-dilated, vertically fixed. At this position of pupil, iris and lens are at maximum approximation which precipitate the condition and patient presents with sudden painful loss of vision.
- Open angle glaucoma is due to blockage of trabecular meshwork. Patient gives a history of slow painless loss of vision.
- Uveitis is inflammation of uveal component. Pupil here called festooned pupil *(anterior uveitis).*

240. Ans. (a) Vertically dilated

Ref: A.K. Khurana, 6th ed. / 239-40, Khurana 4th ed./ 225

- In case of angle closure glaucoma, pupil is mid dilated, vertically fixed.
- Irregularly constricted fixed pupil is seen in anterior uveitis *(known as festooned pupil).*

241. Ans. (c) Acute congestive glaucoma

Ref: A.K. Khurana, 6th ed. pg. 239-41

- Acute congestive glaucoma usually presents with sudden painful loss of vision associated with colored haloes. ACG more commonly seen in middle to elderly females.
- **D/dx of color haloes:**
  - ACG
  - Cataract
  - Mucopurulent conjunctivitis (Not in angular)
- RD presents with sudden painless loss of vision associated with flashes of light.

242. Ans. (b) Latanoprost

Ref: A.K. Khurana, 6th ed. pg. 228-30

GLAUCOMA

- It is a group of conditions characterized by progressive optic neuropathy with characterstic optic disc appearance and irreversible visual field defects.
- It is caused due to retinal ganglion cell death by increase in intraocular pressure (IOP) (usually) or other factors (excitotoxicity/optic nerve spasm)

Classical Triad

- Increase IOP (>21)
- Visual Field decrease
- Optic disk/Nerve changes (damage)

Atleast 2 conditions is required for diagnosis

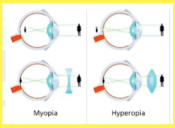
PRIMARY OPEN ANGLE GLAUCOMA

- It is also known as chronic simple glaucoma of adult onset and is characterized by the:
  - Slowly progressive raised IOP
  - Optic disc cupping
  - Specific visual field defects

Question 103

Which of the following is the corrected refractory error:

a. Myopia
b. Hyperopia
c. Presbyopia
d. Astigmatism

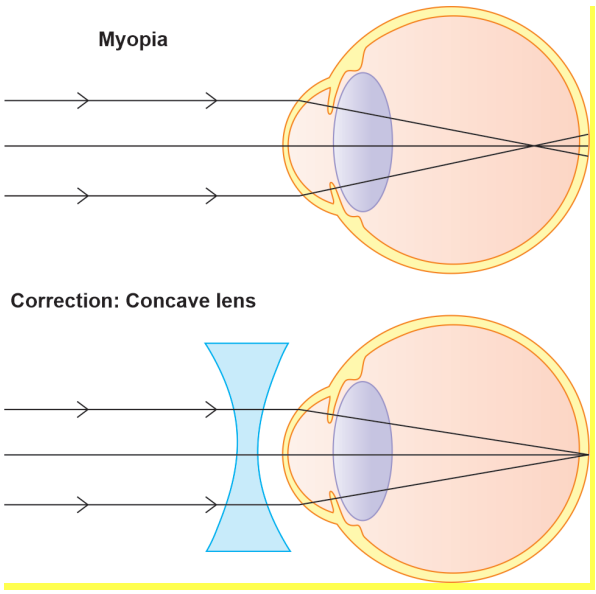


(FMGE JULY 2024)

259. Ans. (a) Myopia

Ref: A.K. Khurana, 7th ed. pg. 41

- Biconcave lens is used for correction of myopia.



260. Ans. (d) Amblyopia

Ref: A.K. Khurana, 7th ed. pg. 344

Amblyopia implies a partial loss of sight in one or both the eyes, in the absence of ophthalmoscopic or other marked objective signs.

261. Ans. (b) Anisometropia

Ref: A.K. Khurana, 7th ed. pg. 44

- **Anisometropia** is the difference in vision between the two eyes and it interferes with normal binocular vision.

262. Ans. (b) Myopia

Ref: A.K. Khurana, 7th ed. pg. 34

- Myopia or shortsightedness is a type of refractive error in which parallel rays of light coming from infinity are focused in front of the retina where accommodation is at rest.
- A myopic child often presents with symptoms like:
  - Moving closer to TV
  - Squeezing eye while watching TV
  - Decreased performance at school
  - Headache or tired looking eyes
  - Blurred vision

263. Ans. (d) Astigmatism

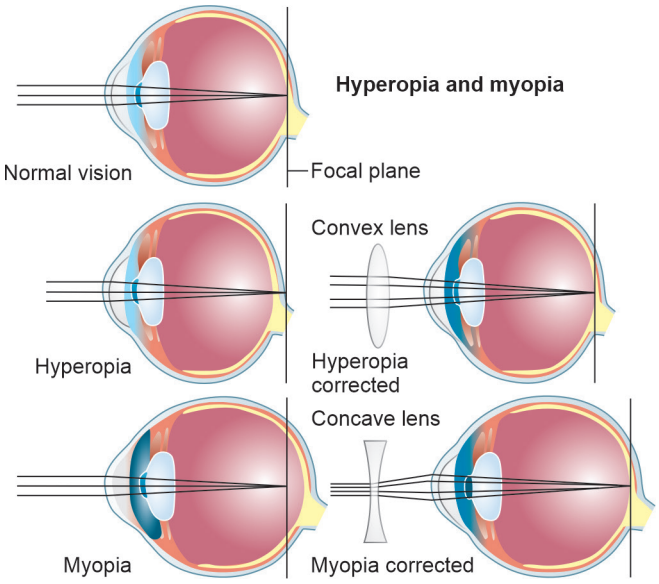
Ref: A.K. Khurana, 7th ed. pg. 42

- The shown image is keratoconus (conical cornea), which is seen in patients with astigmatism.
- Astigmatism occurs when the cornea or lens is curved more steeply in one direction than in another.

264. Ans. (a) Anterior to retina

Ref: Comprehensive Ophthalmology by A.K. Khurana, 7th ed. pg. 38-39

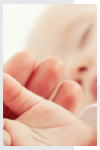
- Near-sightedness, also known as short-sightedness and **myopia**, is an eye disorder where light focuses in front of, instead of on, the retina.
- This causes distant objects to be blurry while close objects appear normal.
- Other symptoms may include headaches and eye strain. Severe near-sightedness is associated with an increased risk of retinal detachment, cataracts, and glaucoma.



265. Ans. (a) Keratoconus

Ref: Comprehensive Ophthalmology by A.K. Khurana, 7th ed. pg. 136-37

- In keratoconus the patient presents with progressive myopia and irregular astigmatism due to change in the curvature of the cornea. The vision becomes more blurred and distorted which can be associated with colored halos glare and photo phobia.
- The patient presents with frequent change of glasses because of this progressive change.



FMGE SOLUTIONS

- It is the most common of all of the vaginal fistulas. Intraoperative injury to the urinary bladder is a primary risk factor for subsequent development of a postoperative VVF.
- Other risk factors for postoperative VVF formation include prior uterine surgery (cesarean section), endometriosis, infection, diabetes, arteriosclerosis, pelvic inflammatory disease, obesity, and prior radiation therapy.

492. Ans. (a) Stress urinary incontinence

Ref: DC Dutta's 9th ed. pg. 410

Stress urinary incontinence is a leakage of urine during moments of physical activity that increases abdominal pressure, such as coughing, sneezing, laughing and exercise. It is the most common type of urinary incontinence in female.

493. Ans. (d) Packing

Ref: Shaws Textbook of Gynecology, 7th ed. pg. 377

- Decubitus ulcer is seen often in a patient of utero vaginal prolapse, which occurs due to localised tissue damage and venous congestion.
- Treatment of this ulcer is done by moist vaginal packing using acriflavine and glycerine soaked gauze.

494. Ans. (c) Needs to be changed every 3 months

Ref: Shaw's Gynecology 16th ed. pg. 356; DC Dutta 9th ed. pg. 293

- Ring pessary is used for prolapse
- The ring pessary is made of soft plastic polyvinyl chloride material and is available in different sizes.
- It is inserted using gel
- Pregnant woman with prolapse needs a ring pessary in the first trimester of pregnancy
  - Uterus grows abdominally, the prolapse gets reduced, and the pessary can then be removed.
- **Current indications for use of pessary are:**
  - A young woman planning a pregnancy
  - During early pregnancy
  - Puerperium

Question 104

A 26-year old nulligravida presents with no cystocele, no rectocele, but has a third degree uterine prolapse. What is the most appropriate management for her condition?

a. Cervical cerclage *(FMGE JULY 2024)*
b. Fothergill repair
c. Shirodkar vaginal approach
d. Abd sling surgery

495. Ans. (c) Pessary

Ref: Shaw's Gynecology 16th ed. pg. 359-60

- Pessary is the conservative treatment for prolapse.
- All other choices are surgical repair

TABLE: Management of genital prolapse

Nulliparous	Abdominal sling operations
Pregnancy Postnatal	Ring pessary up to 16 weeks • Ring pessary and pelvic floor exercises for 3-6 months • Surgery if required thereafter
Young woman <40 years	Conservative vaginal surgery (fertility sparing surgery) • Cystocele, rectocele repair
	• Manchester repair • Sling operation
Woman beyond 40 years and multipara	Vaginal hysterectomy and pelvic floor repair

Extra Mile

Surgeries of prolapse

- **Anterior colporrhaphy:** To repair cystocoele and cystourethrocele
- **Posterior colporrhaphy:** to repair rectocoele and deficient perineum
- **Fothergill's Repair (Manchester Operation):** Anterior colporrhaphy with amputation of cervix
  - Preserves menstrual and childbearing functions
- **Shirodkar's Procedure:** Anterior colporrhaphy and attachment of Mackenrodt ligaments to the cervix on each side is exposed
  - The cervix is not amputated and subsequent pregnancy complications avoided
- **Le Fort's Repair:** reserved for the very elderly menopausal patient with an advanced prolapse.
- **Sling operation:** best for nulliparous prolapse
  - Abdominal sling operation
  - Khanna sling operation
  - Abdominal wall cervicopexy

- If middle swab is wet: Vesicovaginal fistula
- If lowermost swab is wet: Urethrovaginal fistula

4. Ans. (c) Central placenta previa

Ref: Williams Obstetrics, 22nd ed. pg. 578

- Central placenta previa is a complete contraindication to induction of labor. Therefore, expectant management includes planned cesarean section in late gestation which is done between 36 and 37 weeks.
- The primary maternal risk factor in placenta previa is massive hemorrhage, including postpartum bleeding.
- **Contraindications to Induction of Labor:**
  - Placenta previa central/major degree
  - Vasa previa
  - Umbilical cord prolapses
  - Active genital herpes infection
  - Cephalopelvic disproportion

Question 105

Patient with bleeding per vaginum, regular uterine contractions and tender tense abdomen on papation. BP is 150/90. Cervical Dilatation is 5cm and full effacement. Fetal heart rate is 144/min, adequate beat to beat variability. What is the likely diagnosis? *(FMGE JULY 2024)*

a. Placenta previa
b. Abruptio placenta
c.
d.

6. Ans. (c) Abruptio placentae

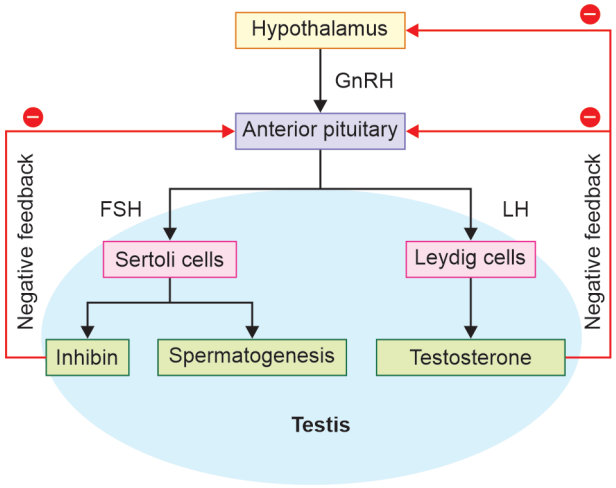
Ref: Williams Obstetrics, 22nd ed. pg. 749

- Placental abruption is when the placenta separates early from the uterus; in other words, separates before childbirth. It occurs most commonly around 25 weeks of pregnancy.
- Symptoms may include vaginal bleeding, lower abdominal pain, and dangerously low blood pressure.
- Most important risk factor for abruptio placenta: Hypertension
- In uterine rupture, fetal parts are palpable and placenta previa presents with painless vaginal bleeding.

7. Ans. (c) Inhibin and Testosterone

Ref: Williams Obstetrics, 22nd ed. pg. 228

- Sertoli cells are involved in inhibin secretion, while Leydig cells secrete testosterone.



8. Ans. (d) Pre-eclampsia

Ref: Williams Obstetrics, 22nd ed. pg. 690

- Pre-eclampsia is defined as BP >140/90 on 2 occasions, 4 hours apart.
- In addition to the blood pressure criteria, proteinuria of greater than or equal to 0.3 grams in a 24-hour urine specimen, a protein (mg/dL)/creatinine (mg/dL) ratio of 0.3 or higher, or a urine dipstick protein of 1+ (if a quantitative measurement is unavailable) is required to diagnose pre-eclampsia.

9. Ans. (b) Second trimester

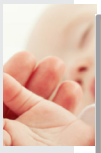
Ref: Williams Obstetrics, 22nd ed. pg. 144

- The quadruple screen test is a blood test done during pregnancy to determine whether the baby is at risk of certain birth defects.
- It is done in second trimester.
- The test measures levels of the following four pregnancy hormones:
  - Alpha-fetoprotein (AFP), a protein produced by the baby.
  - Human chorionic gonadotropin (hCG), a hormone produced in the placenta.
  - Unconjugated estriol (uE3), a form of the hormone estrogen produced in the fetus and the placenta.
  - Inhibin-A

10. Ans. (a) Low BMI

Ref: Williams Obstetrics, 22nd ed. pg. 103

- One form of estrogen called estradiol decreases at menopause. This hormone helps to regulate metabolism and body weight.
- Lower levels of estradiol may lead to weight gain.



Question 106

Multigravida G4P3L3A0 lady presented with labour pains. On examination her cervix is 5cm dilated and the doctor was unable to feel the presenting part. What is the likely diagnosis? *(FMGE JULY 2024)*

a. False labour
b. Uterine rupture.
c. Placenta previa
d.

115. Ans. (b) Uterine rupture

Ref: William's Obstetrics, Chapter 42, 26th ed. pg. 1925

- A uterine rupture is a complete division of all three layers of the uterus.
- Most uterine ruptures occur when the uterus is gravid in the setting of a trial of labor after cesarean delivery.
- More often, rupture is secondary and associated with a preexisting incision, anomaly, or injury of the myometrium.

Symptoms:

- Vaginal bleeding and Abdominal pain
- Abdominal pain
- Hypotension
- Fetal heart rate abnormality
- Fetal body parts are palpable through per abdomen examination

116. Ans. (a) Hypotension

Ref: William's Obstetrics, Chapter 21, 26th ed. pg. 1033-1034, 1052

- Oxytocin is given to women during CS to decrease blood loss.
- When given as rapid IV bolus, it causes hypotension, tachycardia. However, the exact cause of these hemodynamic changes is lesser known.

117. Ans. (b) Uterine inversion

Ref: William's Obstetrics, Chapter 42, 26th ed. pg. 1911, 1912

- Puerperal inversion of the uterus is one of the classic hemorrhagic disasters encountered in obstetrics.
- Unless promptly recognized and managed appropriately, associated bleeding often is massive.

Clinical presentation of inversion of uterus

- Abdominal pain
- Shock out of proportion due to amount of blood loss
- Hypotension, and shock like symptoms.
- Large boggy mass appears at introitus
- MC: Hemorrhage

118. Ans. (c) Sedation and wait

Ref: William's Obstetrics, 26th ed. pg. 1022

- The presenting female is in latent phase of labor.
- During phase 1, the uterus must initiate extensive changes in its size and vascularity to accommodate fetal growth, some low intensity myometrial contractions are felt during the quiescent phase.
- These contractions do not normally cause cervical dilation, and they are common toward the end of pregnancy, especially in multiparas.
- For these patients, the most accurate management is sedation and wait for the progress of labor.

119. Ans. (c) Laminaria tent

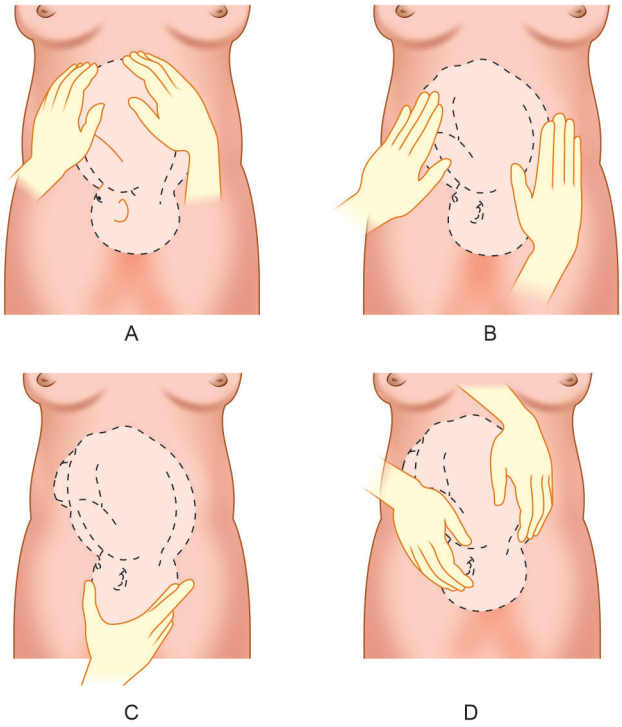
Ref: Dutta 9th ed. pg. 618

- **Laminaria tent:** Is dehydrated, compressed, Chinese sea-weeds. It is use to dilate cervix.
- It works on hygroscopic action due to which slow dilatation of cervical canal takes place. More than one tent is to be introduced to prevent dumpling of the ends.
- It is sterilized by keeping it in absolute alcohol at least for 24 hours.

120. Ans. (c) Leopold 3

Ref: Williams Obstetrics 24th ed. pg. 437-38

- The shown image is leopold's maneuver 3, also known as Pawlik's grip.
- In this the physician will face towards patients head and does suprapubic palpation using thumb and fingers to determine the fetal presentation and station.
- **Note:**
  - In order to differentiate between head and breech presentation, leopold's manuever 1 is done
  - In order to know engagement, LM 4 is done. It is done facing the feet of patient.



- Amenorrhea (75%)
- Bleeding per vaginum (70%)

Note: *Triad is present only in 50% case of ectopic*

- **Most common/Consistent** finding of Ectopic pregnancy: **Pain**

Symptoms

Question 107

In cases of suspected ectopic pregnancy, which of the following hormone is typically measured? *(FMGE JULY 2024)*

a. Estrogen
b. Progesterone
c. Beta hCG
d. Inhibin

243. Ans. (b) TVS

Ref: DC Dutta, 8th ed. pg. 213

- Investigation of choice in a case of ectopic pregnancy/ suspected case of ectopic pregnancy is Transvaginal scan.
- Findings raising suspicion of ectopic on TVS:
  - **Empty uterine cavity: Most important**
  - Finding of complex adnexal mass
  - Fluid (echogenic) in the pouch of Douglas.
  - Adnexal mass clearly separated from the ovary.
  - Rarely cardiac motion may be seen in an unruptured tubal ectopic pregnancy.

Extra Mile

- **Estimation of** B-**hCG:** Urine pregnancy test—ELISA is sensitive to 10-50 mIU/mL and is positive in 95% of ectopic pregnancies. **A single estimation of** B-**hCG level either in the serum or in urine confirms pregnancy but cannot determine its location.**
- **Gold standard for diagnosis of ectopic pregnancy:** Laproscopy

244. Ans. (c) Methotrexate 50 mg IM

Ref: DC Dutta, 8th ed. pg. 216

Dutta states: *"For systemic therapy of ectopic pregnancy, a single dose of methotrexate (MTX) 50 mg/M² is given intramuscularly."*

245. Ans. (a) Vomiting

Ref: Dutta Obs, 7th ed. pg. 182; William Obs, 22nd ed. pg. 258

CLASSIC TRIAD OF ECTOPIC

- **Pain+ Amenorrhea+ Bleeding per vaginum**

Triad is present only in 50% case of ectopic

- **M.C/Consistent** finding of Ectopic → **pain**

Symptoms

- Nausea & Vomiting
- Lower Abdom. pain/generalized Abdom pain
- Shoulder tip pain Syncopal attacks

246. Ans. (c) A negative pregnancy test excludes the diagnosis

Ref: DC Dutta 8th ed./212, Williams Obst. 21st ed./ 892

- **Ectopic pregnancy:** Pregnancy that occurs outside the endometrial lining of uterus.
- Risk factors for ectopic pregnancy include previous ectopic pregnancies and conditions like tubal surgery, tubercular infection that disrupt the normal anatomy of the Fallopian tubes.
- Previous salpingitis/tubal disease is the most common cause of ectopic pregnancy.
- Among contraceptives, use of progestasert is the most common cause of ectopic pregnancy.
- The major health risk of ectopic pregnancy is rupture leading to internal bleeding.
- It can be diagnosed by Beta hCG level. It doesn't rise as fast as it rises in uterine pregnancy.
- ***It can also be diagnosed by pregnancy test, but a negative pregnancy test doesn't rule out the diagnosis of ectopic pregnancy.***
- On transvaginal scan presence of an adnexal mass and the absence of an intrauterine pregnancy increases the likelihood of an ectopic pregnancy.
- ***Methotrexate is considered as drug of choice for ectopic pregnancy.***

247. Ans. (a) Transvaginal USG

Ref: DC Dutta, 8th ed. pg. 212, Williams Obst, 21st ed. pg. 892

Diagnosis of Ectopic Pregnancy

- Most definite diagnosis of pregnancy is by demonstrating intrauterine sac.
- An absence of the intrauterine sac in a patient who is complaining of pain, bleeding and positive pregnancy test raise the suspicion of ectopic pregnancy.
- By doing **transvaginal USG, ectopic pregnancy can be ruled out.** If the USG demonstrates live intrauterine fetus then ectopic pregnancy is very unlikely.
- On the other hand, if the uterus is empty, an ectopic pregnancy can be diagnosed based on the visualization of an adnexal mass separate from the ovaries.
- **Beta-hCG** also helps in diagnosis of pregnancy. It is positive in virtually 100% of ectopic pregnancies.
- A positive test only confirms pregnancy and does not indicate whether it is intrauterine or extrauterine (ectopic).
- *In normal pregnancy beta-hCG should double up every 2 days but in ectopic pregnancy the rate of increase of beta hCG is slow.*

Question 108

A woman who is 17 weeks pregnant presents with hypertension, BP measuring 140/94 mmHg. Four hours later, her blood pressure is recorded again at 144/90 mmHg. What is the most likely diagnosis? *(FMGE JULY 2024)*

a. Gestational hypertension
b. Chronic hypertension
c. Acute on chronic hypertension
d. Pre-eclampsia

277. Ans. (c) Gestational hypertension

Ref: DC Dutta 9th ed. pg. 207

TABLE: Classification of hypertension in pregnancy (National high blood pressure education program 2000 and ACOG-2013)

Disorder	Definition	Disorder	Definition
Hypertension	BP ≥140/90 mm Hg measured two times with at least 6-hour interval	Chronic hypertension with superimposed pre-eclampsia and eclampsia	**The common causes of chronic hypertension:** • Essential hypertension • Chronic renal disease (renovascular) • Coarctation of aorta • Endocrine disorders (diabetes mellitus, pheochromocytoma, thyrotoxicosis
Proteinuria	Urinary excretion of >0.3 g protein/24 hours specimen or 0.1 g/L		
Gestational hypertension	BP >140/90 mm hg for the first time in pregnancy after 20 weeks, without proteinuria		
Preeclampsia	Gestational hypertension with proteinuria		
Eclampsia	Women with preeclampsia complicated with grand mal seizures and/or coma		• Connective tissue diseases (Lupus erythematosus) **The criteria for diagnosis of superimposed preeclampsia:** • New onset of proteinuria >0.5 g/24 hours specimen • Aggravation of hypertension • Development of HELLP syndrome • Development of headache scotoma, epigastric pain
HELLP syndrome	• Hemolysis (H) • Elevated liver enzymes (EL) • Low platelet count (LP)		
Chronic hypertension	Known hypertension before pregnancy or hypertension diagnosed first time before 20 weeks of pregnancy		
Superimposed preeclampsia or eclampsia	Occurrence of new onset of proteinuria in women with chronic hypertension		

278. Ans. (c) Renal agenesis

Ref: DC Dutta 9th ed. pg. 203, 204

- Oligohydramnios is an extremely rare condition **where the liquor amnii is deficient in amount to the extent of** <200 mL at term.
- **Sonographically**, **it is defined** when the maximum vertical pocket of liquor is <2 cm or when amniotic fluid index (AFI) is <5 cm (<5 percentile).
- Absence of any measurable pocket of amniotic fluid is defined as Anhydramnios. AFI between 5 and 8 is termed as borderline AFI or borderline Oligohydramnios.
- Internal organ malfunction like renal agenesis can cause this problem.

Causes:

Fetal cause	Maternal cause

• Renal cause (MCC)
  ▪ Renal agenesis
  ▪ Polycystic kidney
  ▪ Urethral obstruction
• Fetal growth restriction
• Premature rupture of membranes
• Post-term pregnancy
• Fetal death
• Drugs exposure like: PG inhibitor, ACE inhibitor
	• Hypertension
	• Uteroplacental insufficiency
	• Dehydration
	• Idiopathic

283. Ans. (a) Mannitol

Ref: DC Dutta, 8th ed. pg. 275

- A deeply unconscious patient with raised intracranial pressure needs steroid and/or diuretic therapy.
- DOC for eclampsia: $MgSO_4$.

284. Ans. (b) Heart disease

Ref: DC Dutta, 8th ed. pg. 256

- **Pre-eclampsia** is a multisystem disorder of unknown etiology characterized by development of hypertension to the extent of **140/90 mm Hg** or more with proteinuria after the 20th week in a previously normotensive and non-proteinuric woman.
- The incidence in primigravidae is about 10% and in multigravidae 5%.

Etiopathogenesis of Pre-eclampsia

- **Hypertension:** The underlying basic pathology is **endothelial dysfunction** and intense **vasospasm**, affecting almost all the vessels, particularly those of uterus, kidney, placental bed and brain. The basic underlying pathology remains as **endothelial dysfunction** and **vasospasm**.

Risk Factors for Pre-eclampsia

- Primigravida: Young or elderly (first time exposure to chorionic villi)
- Family history: Hypertension, preeclampsia
- Placental abnormalities:
  - Hyperplacentosis: Excessive exposure to chorionic

Question 109

What is given to prevent neural tube defects in pregnancy? *(FMGE JULY 2024)*

a. Iron
b. Calcium
c. Folic acid
d. Vitamin B12

285. Ans. (a) Folic acid supplementation

Ref: DC Dutta, 8th ed. pg. 585

- Use of anti- epileptic drugs like phenytoin, valproate and even phenobarbitone has been shown in pregnancy to contribute to acquire folic acid deficiency.
- If a lady is deficient in folic acid at the time of her pregnancy, then the baby most likely will born with neural tube defect.
- Traditionally we study that folic acid should be taken peri-conceptionally 2 months before and 3 months later to pregnant status at dose of 400 micrograms.
- However with the use of anti-epileptics drugs like phenytoin, valproate etc. the dose of folic acid needs to be supplemented at a dose of 4 mg once per day.

286. Ans. (c) MRI

Ref: William's Gyne, chapter 12- Breast Diseases; Breast CA screening

MAGNETIC RESONANCE IMAGING

- This screening option has recently been evaluated among genetically high-risk women. It is particularly attractive in this group of women, who develop breast cancer at a rate of 2 percent per year between the ages of **25 and 50,** a time during which mammography sensitivity is reduced by dense breast tissue.
- ***In general, MR imaging shows higher sensitivity and specificity than mammography.***
- *In the case given, patient is a 42 year primigravida, which in-itself is at high risk of developing congenital anomaly. By giving tests like mammography, condition can be worsened. Hence MRI is considered as the best modality of screening. Also it has higher sensitivity and specificity than other given tests.*

SCREENING MAMMOGRAPHY

- Considered as screening IOC.
- This radiographic test is currently the best available and most thoroughly validated breast cancer screening test available.
- At this time, it is generally accepted that for women aged 50–69 years, screening mammography reduces breast cancer mortality.

Screening Sonography: This modality identifies mammographically occult breast cancer in less than 1 percent of women.

287. Ans. (a) Bile acid

Ref: William's 23rd ed. Ch 50, Hepatic GB and pancreatic disorders; Intrahepatic cholestasis of Pregnancy

INTRAHEPATIC CHOLESTASIS OF PREGNANCY

- This disorder also has been referred to as recurrent jaundice of pregnancy, cholestatic hepatosis, and icterus gravidarum.
- It is characterized clinically by pruritus, icterus, or both.

Pathogenesis

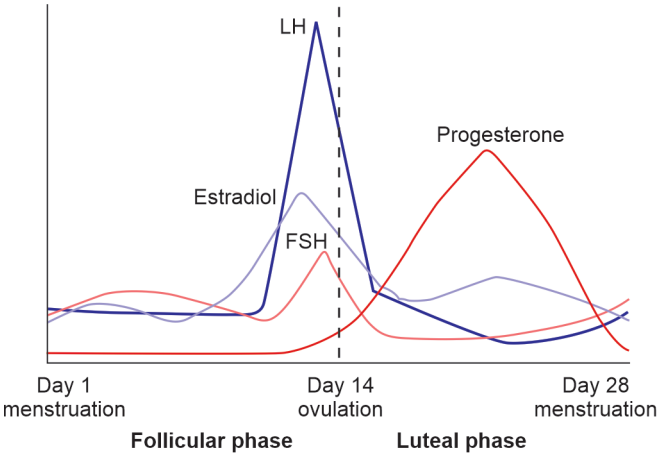
- The cause of obstetrical cholestasis is unknown, but it probably occurs in genetically susceptible women.
- Whatever the inciting cause(s), bile acids are cleared incompletely and accumulate in plasma. ***Of note, total***

- Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome is a disorder that occurs in females and mainly affects the reproductive system. This condition causes the vagina and uterus to be underdeveloped or absent, although external genitalia are normal.
- These individuals have normal pubertal development, normal ovarian function, and a 46, XX karyotype, and they commonly present with primary amenorrhea at 15 to 16 years of age.

316. Ans. (a) A

Ref: Shaw's Textbook of Gynaecology, 7th ed. pg. 49, 59

- The level of LH rises just before ovulation. LH peak is responsible for ovulation.



317. Ans. (b) Creates a negative pressure of 60 mm Hg

Ref: William's Obstetrics, Chapter 11, 26th ed. pg. 546; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7567277/

- Following dilation, for most first-trimester aspiration procedures, an 8–12 mm Karman cannula is appropriate.
- Small cannulas carry the risks of a longer surgery and of missed intrauterine tissue. For evacuation, the cannula is slowly moved toward the fundus until resistance is met. Suction is then activated.
- It creates a negative pressure of 660 mm Hg.
- The cannula is gradually pulled back toward the os and is simultaneously slowly turned circumferentially to cover the entire uterine cavity surface. This is repeated until no more tissue is aspirated.
- Capacity → 60 mL

318. Ans. (c) It has 4 to 6 lobes

Ref: William's obstetrics, 23rd ed. Implantation, Embroyogenesis and Placental development

PLACENTAL GROWTH

- ***In the first trimester, placental growth is more rapid than that of the fetus.***
- ***By approximately 17th weeks period of gestation, placental and fetal weights are approximately equal.***
- By term, placental weight is approximately one sixth of fetal weight.
- The average placenta at term is 185 mm in diameter and 23 mm in thickness, ***with a volume of 497 mL and a weight of 508 g.*** These measurements vary widely.
- From the maternal surface, the number of slightly elevated convex areas, called lobes, varies from 10 to 38

Question 110

Which of the following is the Mechanism of action of Inhibin? *(FMGE JULY 2024)*

a. Inhibits FSH
b. Increased FSH secretion
c. Increases Estradiol
d. Inhibits estradiol

319. Ans. (c) FSH

Ref: D.C. Dutta, 6th ed. pg. 56

- There is a significant fall in the level of serum estradiol from 50–300 pg/ml before menopause to 10–20 pg/ml after menopause.
- This decrease the negative feedback effect on hypothalamopituitary axis resulting in increase in FSH.
- The increase in FSH is also due to diminished inhibin.

320. Ans. (b) IgG

Ref: Robbin's, 9th ed. pg. 198-199

321. Ans. (c) 3 months

Ref: DC Dutta, 8th ed. pg. 735

322. Ans. (c) 300 µg

Ref: DC Dutta, 8th ed. pg. 387, 721

GYNECOLOGY

ANATOMY, MENARCHE AND MENOPAUSE

323. Ans. (c) O

"O" is suggestive of ovulation, for ovulation LH surge is important that occur on 14th day of menstural cycle.

Degree of risk	Risk factors
High	Previous ectopic pregnancy
	Previous tubal surgery
	Tubal ligation
	Tubal pathology
	In utero DES exposure
	Current IUD use
Moderate	Infertility
	Previous cervicitis (gonorrhea, chlamydia)
	History of pelvic inflammatory disease
	Multiple sexual partners
	Smoking
Low	Previous pelvic/abdominal surgery
	Vaginal douching
	Early age intercourse (<18 years)

CLINICALLY IT IS PRESENTED IN THREE TYPES

Acute

- **Symptoms:** Amenorrhea, Abdominal pain, Vaginal Bleeding, vomiting fainting attack (syncopal attack).

Unruptured

- **Symptoms:** Presence of delayed period or spotting with features suggestive of pregnancy, Uneasiness on one side of the flank.

Chronic

- **Symptoms:** 6–8 weeks of amenorrhea, lower abdominal pain, vaginal bleeding (dark colored), dysuria.

453. Ans. (d) Bilateral cystectomy, adhesiolysis and prepare for IVF

- "Kissing-ovaries" are endometriotic adhesions binding down the ovaries into the pouch of Douglas 'Kissing-Ovaries'.
- Management of endometriosis in case of formation of ovarian cyst (chocolate cyst of ovary)
- Less than 5 cm – incision and drainage and destroy wall of cyst with laser
- More than 5 cm – cystectomy, adhesiolysis.
- Since this patient is young, IVF is recommended.

454. Ans. (c) Uterine synechiae

Ref: Berek and Novak's Gynecology, 15th ed. pg. 2009

- Severe trauma to the basalis layer of the endometrium with subsequent tissue bridge formation leads to intrauterine synechiae or Asherman's syndrome.
- Symptoms of severe disease include amenorrhea, menstrual irregularities, spontaneous abortion and recurrent pregnancy loss.

455. Ans. (d) PID

Ref: Berek and Novak's Gynecology, 16th ed. pg. 788

Question 111

What is the best post-coital contraceptive method among the following options? *(FMGE JULY 2024)*

a. Levonorgestrel (LNG)
b. Estrogen
c. Norethisterone
d. Ulipristal acetate

456. Ans. (a) Levonorgestrel tablet single dose 1.5 mg

Ref: Berek and Novak's Gynecology,16th ed. pg. 824

- Levonorgestrel is almost as effective at 3 to 5 days after intercourse.
- WHO recommends 1.5 mg of levonorgestrel as a single dose, given up to 120 hours after intercourse.
- Levonorgestrel works only if it is administered prior to the day of ovulation.

457. Ans. (b) OCP

Ref: Berek and Novak's Gynecology, 16th ed. pg. 809

- In a newly married couple, contraception of choice is OCP, especially if the female has menstrual irregularities.

Non Contraceptive Benefits of Oral Contraceptives

Menses Related

- Increased menstrual cycle regularity
- Reduced blood loss
- Reduced iron deficiency anemia
- Reduced dysmenorrhea
- Reduced symptoms of premenstrual dysphoric disorder

458. Ans. (a) OCP

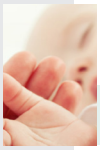
Ref: Berek and Novak's Gynecology, 16th ed. pg. 798

- Women who use estrogen containing hormonal contraceptives are at increased risk for venous thrombosis and thromboembolism.
- Normally the coagulation system maintains a dynamic balance of procoagulant and anticoagulant systems.
- Estrogens affect both systems in a dose-related fashion.

459. Ans. (a) Oral contraceptive pills

Ref: Berek and Novak's Gynecology, 16th ed. pg. 776

- Use of estrogen-progestin hormonal methods are category 2 in breastfeeding women.



FMGE SOLUTIONS

- It is the most common of all of the vaginal fistulas. Intraoperative injury to the urinary bladder is a primary risk factor for subsequent development of a postoperative VVF.
- Other risk factors for postoperative VVF formation include prior uterine surgery (cesarean section), endometriosis, infection, diabetes, arteriosclerosis, pelvic inflammatory disease, obesity, and prior radiation therapy.

492. Ans. (a) Stress urinary incontinence

Ref: DC Dutta's 9th ed. pg. 410

Stress urinary incontinence is a leakage of urine during moments of physical activity that increases abdominal pressure, such as coughing, sneezing, laughing and exercise. It is the most common type of urinary incontinence in female.

493. Ans. (d) Packing

Ref: Shaws Textbook of Gynecology, 7th ed. pg. 377

- Decubitus ulcer is seen often in a patient of utero vaginal prolapse, which occurs due to localised tissue damage and venous congestion.
- Treatment of this ulcer is done by moist vaginal packing using acriflavine and glycerine soaked gauze.

494. Ans. (c) Needs to be changed every 3 months

Ref: Shaw's Gynecology 16th ed. pg. 356; DC Dutta 9th ed. pg. 293

- Ring pessary is used for prolapse
- The ring pessary is made of soft plastic polyvinyl chloride material and is available in different sizes.
- It is inserted using gel
- Pregnant woman with prolapse needs a ring pessary in the first trimester of pregnancy
  - Uterus grows abdominally, the prolapse gets reduced, and the pessary can then be removed.
- **Current indications for use of pessary are:**
  - A young woman planning a pregnancy
  - During early pregnancy
  - Puerperium

Question 112

A 26-year old nulligravida presents with no cystocele, no rectocele, but has a third-degree uterine prolapse. What is the most appropriate management for her condition? *(FMGE JULY 2024)*

a. Cervical cerclage
b. Fothergill repair
c. Shirodkar vaginal approach
d. Abd sling surgery

495. Ans. (c) Pessary

Ref: Shaw's Gynecology 16th ed. pg. 359-60

- Pessary is the conservative treatment for prolapse.
- All other choices are surgical repair

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Pregnancy Postnatal	Ring pessary up to 16 weeks • Ring pessary and pelvic floor exercises for 3-6 months • Surgery if required thereafter
Young woman <40 years	Conservative vaginal surgery (fertility sparing surgery) • Cystocele, rectocele repair
	• Manchester repair • Sling operation
Woman beyond 40 years and multipara	Vaginal hysterectomy and pelvic floor repair

Extra Mile

Surgeries of prolapse

- **Anterior colporrhaphy:** To repair cystocele and cystourethrocele
- **Posterior colporrhaphy:** to repair rectocoele and deficient perineum
- **Fothergill's Repair (Manchester Operation):** Anterior colporrhaphy with amputation of cervix
  - Preserves menstrual and childbearing functions
- **Shirodkar's Procedure:** Anterior colporrhaphy and attachment of Mackenrodt ligaments to the cervix on each side is exposed
  - The cervix is not amputated and subsequent pregnancy complications avoided
- **Le Fort's Repair:** reserved for the very elderly menopausal patient with an advanced prolapse.
- **Sling operation:** best for nulliparous prolapse
  - Abdominal sling operation
  - Khanna sling operation
  - Abdominal wall cervicopexy

- Due to cleft in mitral valve, the LV decompresses into LA leading to overloading of left atrium. In contrast in O. Secundum ASD it is right atrium and right ventricular that develop overloading.

GASTROINTESTINAL TRACT

175. Ans. (d) Portal vein thrombosis

Ref: Nelson Textbook of Pediatrics 20th ed. pg. 1975

- The combination of clinical findings of Hematemesis and splenomegaly points to diagnosis of portal hypertension.
- Now since child underwent exchange transfusion for neonatal jaundice it implies vascular access was taken via umbilical vein. Umbilical vein catheterization carries the inherent risk of causing portal vein thrombosis.
- Once portal vein thrombosis occurs pressure in splenic vein will rise and cause congestive splenomegaly.
- Later due to rising pressure in portal vein portal systemic collaterals will develop in form esophageal varices. The rupture of esophageal varices explains the first line of the question as to why the child had hematemesis.

176. Ans. (c) Hypertrophic pyloric stenosis

Ref: Nelson, 20th ed. pg. 1787

Ileal atresia	Presents as bilious vomiting and triple bubble sign on X-ray Abdomen.
Duodenal atresia	Presents as bilious vomiting and double bubble appearance on X-Ray abdomen
Hypertrophic pyloric stenosis	The presentation is after 2 weeks of life in usually a first born boy baby. The child presents with non-bilious vomiting.
Trachea-esophageal fistula	Presents with choking after feeds with failure to thrive. Drooling of saliva in neonates indicates esophageal atresia.

177. Ans. (b) 10 mg

Ref: Nelson, 20th ed. pg. 1872-73

Zinc supplementation is given at a dose of 2RDA per day (20 mg per day for >6 months and 10 mg/day for younger than 6 months) for 14 days is effective in reducing severity of diarrhea as well as duration of episode.

178. Ans. (c) Trauma

Ref: Nelson's Pedia, 18th ed. Ch. 340

The list of illnesses that can mimic acute appendicitis includes: 1. Gastroenteritis; 2. Mesenteric adenitis; 3. Meckel diverticulitis; 4. Inflammatory bowel disease; 5. Pneumonia; 6. Cholecystitis; 7. Urinary tract infection; 8. Infectious enteritis; 9. Testicular torsion.

179. Ans. (a) Zinc

Ref: OP Ghai, 8th ed. pg. 121

- The World Health Organization (WHO) and UNICEF

Question 113

A neonate presents with recurrent projectile vomiting, which is non bilious. What is the electrolyte abnormality that is expected in this condition? *(FMGE JULY 2024)*

a. Hyperkalemic hyperchloremic Metabolic acidosis
b. Hypokalemic hypochloremic Metabolic alkalosis
c. Hyperkalemic hypochloremic Metabolic acidosis
d. Hyperkalemic hyperchloremic Metabolic alkalosis

180. Ans. (d) Ultrasound

Ref: Nelson, 18th ed. pg. Ch. 326.1

ULTRASONOGRAPHY

- ***The criterion standard imaging technique for diagnosing HPS***
- *Muscle wall thickness 3 mm* or greater and *pyloric channel length 14 mm* or greater *are considered abnormal* in infants younger than 30 days.

BARIUM UPPER GI STUDY

- Effective when Ultrasonography is not diagnostic.
- Should demonstrate an elongated pylorus with antral indentation from the hypertrophied muscle.
- May show the "double track" sign when thin tracks of barium are compressed between thickened pyloric mucosa or the "shoulder" sign when barium collects in the dilated pre-pyloric antrum.
- Serum electrolytes should be measured to document adequacy of fluid resuscitation and correction of electrolyte imbalances before surgical repair.
- The definitive treatment of pyloric stenosis is with surgical pyloromyotomy known as Ramstedt's procedure
- It is done by simple incision of about 3–4 cm which leads to relaxation of pyloric muscles and hence gastric outlet opens up.

The classic biochemical abnormality seen in case of HPS is hypochloremic, hypokalemic metabolic alkalosis with paradoxical aciduria.

181. Ans. (c) Erythromycin

Exposure to erythromycin between 3 and 13 days of life is associated with an eightfold risk of infantile hypertrophic pyloric stenosis (IHPS) developing shortly thereafter, according to the results of a retrospective cohort study published in the July, 2015 issue of the Archives of Pediatric and Adolescent Medicine.

Extra Mile

Perinatal drug exposure	Teratogenic effect
Lithium	Ebstein anomaly
Vitamin D3	William syndrome (supravalvular aortic stenosis)
Thalidomide	Phocomelia

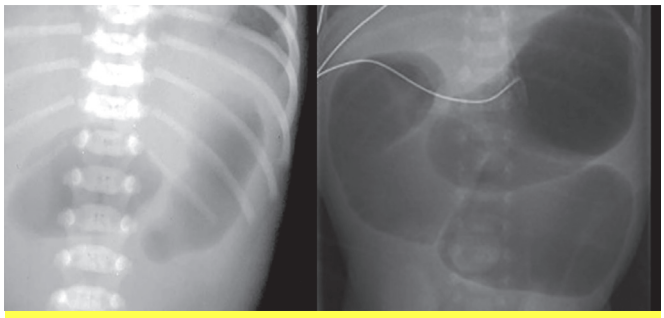
Question 114

Identify the image given below? *(FMGE JULY 2024)*

a. Duodenal atresia
b. Jejunal atresia
c. Small bowel obstruction
d. Pyloric atresia

182. Ans. (b) Duodenal atresia

Ref: Nelson, 18th ed. pg. Ch. 327.1



Look at the two X-rays. The left one shows double bubble appearance of duodenal atresia and the right one shows triple bubble sign of jejunoileal atresia.

183. Ans. (d) Pyloric stenosis

Ref: Nelson, 18th ed. pg. Ch. 326.1

- All babies REGURGITATE curdled milk. So the mother is instructed to always put the baby to shoulder after breastfeeding the child as this shall help the child burp and expel the swallowed air.
- However, if a male infant, first born, 2–3–weeks old is brought to your clinic with recurrent vomiting which is non-bilious and associated with failure to gain weight, then suspect-HYPERTROHPIC PYLORIC STENOSIS
- A lump may be palpable to gentle examination in the epigastrium with finding of visible peristalsis. The investigation of choice shall be USG abdomen. Surgery to be done shall be a pyloromyotomy (Ramstedt operation).

Extra Mile

- **Hypokalemic hypochloremic metabolic alkalosis** is seen in = Hypertrophic pyloric stenosis
- **Hyperkalemic hyperchloremic metabolic acidosis** is seen in = Uretero-sigmoidostomy
- MC cause of hematochezia in a preterm neonate = Necrotizing Enterocolitis
- MC cause of hematochezia in children= Rectal Prolapse> Meckel's Diverticulum
- Double bubble sign= duodenal atresia
- Inverto-gram (Special X-ray of the baby in inverted position) isused for = Anorectal malformations

184. Ans. (b) Alkaline urine

Ref: Lippincott's, 4th ed. pg. 85

LACTOSE INTOLERANCE/LACTASE DEFICIENCY

The classic example of osmotic diarrhea is lactose intolerance due to lactase enzyme deficiency. *The colonic bacteria ferment the non-absorbed lactose to short-chain organic acids, generating an osmotic load and causing water to be secreted into the lumen.*

- Lactose is by far the most commonly Mal-absorbed carbohydrate.
- Secondary lactose intolerance follows small bowel mucosal damage (celiac disease, rotavirus infection) and is usually transient, improving with mucosal healing.
- Lactase deficiency can be diagnosed by hydrogen breath test or by measurement of mucosal lactase concentration with small bowel biopsy
- *Confirmatory diagnosis is made by stool acidity test, undigested lactose creates lactic acid that can be detected in stool sample.*
- *Undigested lactose may get absorbed and eliminated in urine (Lactoseuria), hence acidic urine.*
- In lactose intolerance reducing substance will be positive by Benedict's test in urine.
- Diagnostic testing is not mandatory and often simple dietary changes that produce symptom relief. Eliminate lactose from the diet result in symptom relief
- *Treatment* of lactase deficiency *consists of a milk-free diet.*

185. Ans. (b) Non reducing sugar in urine

Ref: Lippincott's, 4th ed. pg. 85

Refer to above explanation Q. 184

186. Ans. (a) Doudenal atresia

Ref: Bailey and love 24th ed., /1199

- The hallmark of duodenal obstruction is **bilious vomiting** without abdominal distention, which is usually noted on the 1st day of life.

FMGE SOLUTIONS

10. Ans. (b) Pringle maneuver

Ref: Harrison's 21st ed. pg. 374

- The image shows a soft clamp placed on the portal triad to reduce the arterial and portal venous inflow into the liver and is called Pringle maneuver. However, it does not control the backflow from IVC and hepatic veins.
- Pringle maneuver indications are:
  - Halt hemorrhage and find the source of bleeding in liver trauma, allowing time for repair
  - In the setting of hepatic resection of benign and malignant lesions, it can be used to control bleeding.
- Option a, **Kocher maneuver** is the dissection of the lateral peritoneal attachments of the duodenum to allow inspection of the duodenum, pancreas, and other retroperitoneal structures over to the great vessels.
- Option c, **Cattell maneuver** is mobilization of the ascending colon to the midline.
- Option d, **Mattox maneuver** is mobilization of the descending colon to the midline to expose the abdominal aorta.

11. Ans. (c) Serosa

Ref: Bailey and Love's Short Practice of Surgery, 27th ed. pg. 1067

Unlike the rest of gut, esophagus has no serosa which rather facilitates easier spread of esophageal cancer as compared other GI malignancies.

12. Ans. (a) Trichobezoar

Ref: Bailey and Love's Short Practice of Surgery, 27th ed. pg. 1142

The image shows Trichobezoar/hairball which is exclusively found in young female psychiatric patients due to pathological ingestion of hair which remains undigested in stomach. Diagnosis is usually made on Endoscopy.

13. Ans. (c) Melanoma

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 609

- The lesion shows pre-existing nevus which is showing vertical growth in form of nodularity as well as horizontal spread. Cumulative ultraviolet radiation (UVR) exposure in white-skinned races increased the risk.
- Option a, Basal cell carcinoma is common in elderly males, has pearly rolled out margins, occurs on face and is called rodent ulcer. Option b, Squamous cell carcinoma will not have pigmentation as visible in the image. Option d, Junctional melanocytic nevus would be considered only if the lesion had not increased in size.

Question 115

A patient came to OPD with chief complaint of swelling in the thyroid region which moves with deglutition and protrusion of the tongue, there is rupture of swelling with pus discharge, what is the preferred treatment? *(FMGE JULY 2024)*

a. Sistrunk procedure
b. Antibiotics
c. Incision and drainage
d. None of the above

14. Ans. (a) Sistrunk operation

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 755

Midline neck swelling that moves up with tongue protrusion is thyroglossal cyst. Treatment is Sistrunk operation which includes excision of whole thyroglossal tract. The procedure involves removal of the body of hyoid bone and suprahyoid tract. Option b, commando operation is done for cancer of tongue. Option c, Local irradiation is done for Hodgkin lymphoma. Option d, Radioiodine ablation is done for Graves' disease.

15. Ans. (a) Normal saline

Ref: uptodate.com

- Normal saline (NS) and Ringer lactate are preferred crystalloids for managing intraoperative fluid loss.
- In most clinical settings, normal saline is the choice of fluid for many indications for fluid resuscitation, maintenance, or as a solvent for medication delivery except burns, cholera and metabolic acidosis.

Extra Mile

- Excess of NS can cause hyperchloremic acidosis.
- Ringer lactate with blood products will bind to citrate in additive solution of whole blood.
- Hypotonic fluids like 5% dextrose will worsen cerebral edema.

16. Ans. (a) Pneumothorax

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 919

Chest X-ray (CXR) shows collapsed lung on right side with tracheal shift to left. The right side has absent vascular markings in comparison with left side. These features point to the development of pneumothorax.

17. Ans. (c) Ranula

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 779

The bluish cystic swelling in floor of mouth is called Ranula. It is a mucous extravasation cyst that arises from sublingual gland. It can resolve spontaneously but can require surgery. Incision and drainage (I&D) can result in recurrence. Option a, Pleomorphic adenoma is derived from parotid gland and will present as jaw swelling. Option b, Dermoid cyst is midline swelling. Option d, Cystic hygroma arises in posterior triangle of neck.

Question 116

A patient is brought to emergency with a history of fall, a CT brain was performed, what is best option for treatment?

a. Decision and Evacuation *(FMGE JULY 2024)*
b. Craniotomy
c. Burr hole drainage
d. Arterial dissection

18. Ans. (b) Depth of invasion

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 1090, 1334

For all GI malignancies, the most important determinant of extent of disease is depth of invasion by cancer cells.

19. Ans. (a) Radiation esophagitis

Radiation esophagitis is a side effect for patients undergoing radiation for malignancies, usually for lung, breast, and other thoracic cancers due to its close proximity. Usual manifestations occur within 3–4 weeks of receiving radiation.

20. Ans. (d) Congenital adrenal hyperplasia

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 844

- CT abdomen shows distorted kidney on left side and above it is cerebriform appearance of adrenal glands which is visible in congenital adrenal hyperplasia.
- Since liver is not in the image, option a and b cannot be commented on. The mass is bilateral and above the kidneys making renal cell carcinoma (RCC) unlikely.

21. Ans. (b) Craniotomy with evacuation

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 334

The non-contrast CT (NCCT) scan of the head shows lenticular hyperdensity which is seen with extradural hemorrhage. Management is craniotomy with evacuation of hematoma to reduce the midline shift and intracranial pressure.

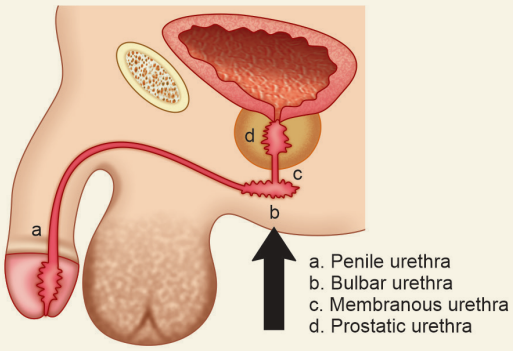
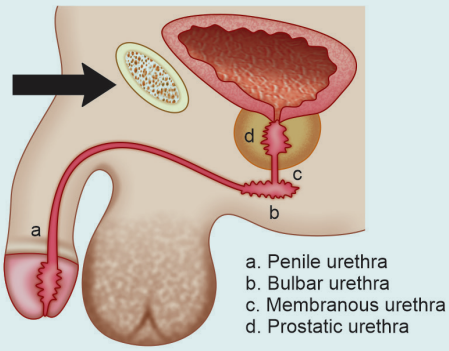
22. Ans. (b) MRI abdomen

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 845

The clinical diagnosis of patient is pheochromocytoma. The imaging modality to be done initially is MRI abdomen. MIBG scan is done if biochemical evidence of tumor is present in the form of elevated metanephrines but MRI abdomen is normal. MRI is preferred since Contrast media used in CT scan can trigger paroxysms.

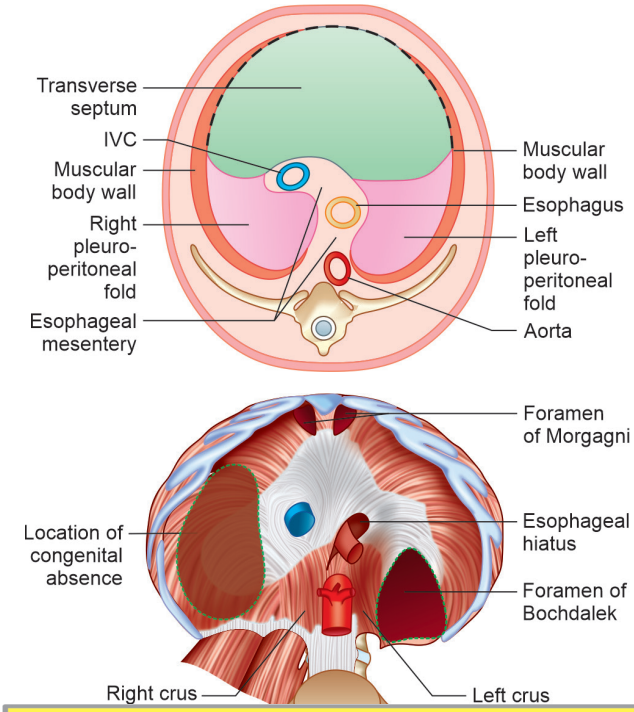
23. Ans. (a) Rupture of bulbar urethra

Ref: Bailey and Love's Short Practice of Surgery, 26th ed. pg. 1479

Rupture of anterior urethra	Rupture of posterior urethra
Trauma to *bulbous urethra* due to fall astride projectile object like cycling, manhole cover, gymnasium	Trauma to *membranous and/or prostatic urethra* after pelvic fracture sustained in RTA.
	
	

Contd...

occurs due to congenital defect in diaphragm. This herniation of bowel into chest cavity is called as Bochdalek hernia. It occurs posteriorly in the diaphragm due to failure of pleuroperitoneal membrane closure in utero. Scaphoid abdomen is explained by herniation of abdominal contents into chest cavity.



Question 117

A chid is was brought with recurrent episodes of vomiting. An x ray was done. What will be seen in this patient?

a. Hypokalemia
b. Hyperkalemia
c. Hyponatremia
d. Hypernatremia

(FMGE JULY 2024)

85. Ans. (a) Hypokalemia

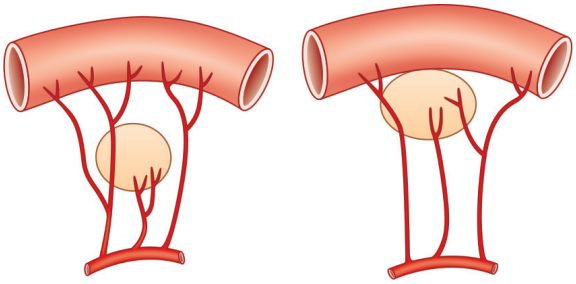
Ref: Bailey and Love 27th ed. pg. 1297

X-ray abdomen shows dilated bowel loops diagnostic of ileus. The leading electrolyte abnormality responsible is hypokalemia. The resultant stasis leads to accumulation of fluid and gas in the bowel associated with distention, vomiting, absence of bowel sounds and absolute constipation.

86. Ans. (d) Chylolymphatic cyst

Ref: Bailey and Love 27th ed. pg. 1062

The key word is abdominal swelling that is mobile in single direction i.e. perpendicular to line of attachment of mesentery. The diagnosis is mesenteric cyst. It is of two types as shown in the image.



Chylolymphatic cyst Enterogenous cyst

Extra Mile

Tillaux's traid helps us in diagnosis of Mesenteric cyst during physical examination:
This triad consists of:
- Fluctuant swelling (cyst) near the umblicus.
- It moves freely in direction vertical on the attachment of mesentery
- It is dull surrounded by a zone of resonance and traversed by band of resonance.

87. Ans. (a) Meckel's diverticulum

Ref: Bailey and Love 27th ed. pg. 1252

The postoperative specimen shows a diverticulum on anti-mesenteric margin which is following the rule of 2 (2 feet from ileocaecal junction and measuring 2 inches in length). The diagnosis is Meckel diverticulum.

Extra Mile

Most common malformation of mid gut is Meckel's Diverticulum
Rule of 2
<2 years of age
2× more common in males
2% of population
2 feet proximal to ileocecal valve
2 inches in length
2% adults symptomatic
2 ectopic tissues present (gastric and pancreatic)

88. Ans. (c) Loop ileostomy

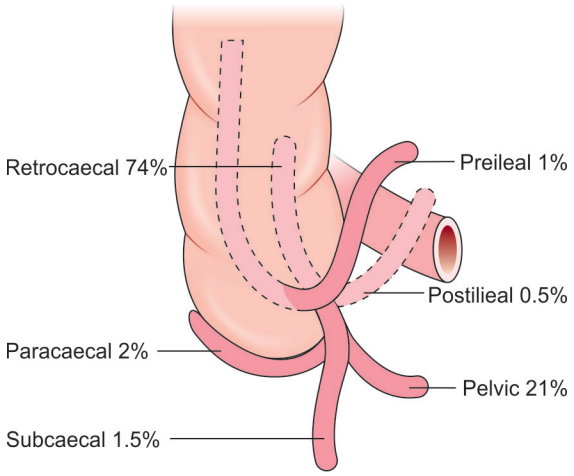
Ref: Bailey and Love 27th ed. pg. 1556

The image shows a stoma with two openings in right iliac fossa of the patient. The RIF location helps in determining it is ileostomy and the presence of two stomas help in determining it is loop ileostomy. In case single opening was present here then the answer would have been end ileostomy.

acidosis from loss of bicarbonate buffering capacity and replacement with excess chloride) or a balanced salt solution such as Ringer's lactate (being cognizant of the presence of potassium and potential renal dysfunction).

134. Ans. (b) Post-ileal

Ref: Bailey, 26th ed. pg. 1199



Most common positon of appendix is Retro-caecal 74%
Least common position of appendix is Post-ileal variety

Question 118

A patient underwent bronchoscoy procedure, during the procedure perforation occured at 25 cmt from the incisors. Which structure is likely to be damaged? *(FMGE JULY 2024)*

a. Diaphragm
b. Arch of aorta
c. Pharyngoesophageal junction
d. T10

136. Ans. (a) 15 cm

Bailey and Love, 26th ed. ch. 62/982

The esophagus has 3 constrictions in its vertical course, as follows:

- **The first constriction is at 15 cm from the upper incisor teeth**, where the esophagus commences at the cricopharyngeal sphincter; this is the narrowest portion of the esophagus and approximately corresponds to the sixth cervical vertebra
- **The second constriction is at 25 cm from the upper incisor teeth,** where it is crossed by the aortic arch and left main bronchus.
- **The third constriction is at 40 cm from the upper incisor teeth,** where it pierces the diaphragm; the lower esophageal sphincter (LES) is situated at this level.

137. Ans. (b) Barium swallow

Ref: Bailey & Love, 26th ed. pg. 989

- Dysphagia is difficulty in swallowing. The cause can be esophageal in origin.
- The motility disorders are best evaluated with esophageal manometry.
  - **Barium swallow:** For esophageal diseases
  - **Barium meal follow through:** Small intestine pathology.
  - **Barium enema:** Colonic and rectal diseases

138. Ans. (d) Metabolic alkalosis

Ref: Bailey & Love, 26th ed. pg. 1018

- In Zenker's diverticulum, the contents of stomach are not lost and therefore metabolic alkalosis cannot occur. *Loss of stomach acid in lieu of reverse peristalsis in chronic vomiting leads to metabolic alkalosis.* When there is excessive pressure within the lower pharynx, the weakest portion of the pharyngeal wall balloons out, forming a diverticulum. Uncoordinated swallowing, impaired relaxation of the cricopharyngeus muscle leads to an increase in pressure within the distal pharynx, so that its wall herniates through the point of least resistance (Killian's triangle).
- Best investigation for Zenker diverticulum is barium swallow and best treatment is surgical resection.

139. Ans. (d) Corkscrew esophagus

Ref: Bailey & Love, 26th ed. pg. 1014

- Corkscrew esophagus is seen in diffuse esophageal spasm and not in achalasia cardia.
- **Diffuse esophageal spasm** is a condition in which uncoordinated contractions of the esophagus occur. These spasms do not propel food effectively to the stomach. It can cause dysphagia, regurgitation and chest pain.
- **Esophageal achalasia** is an esophageal motility disorder involving the smooth muscle layer of the esophagus and the lower esophageal sphincter (LES). It is characterized by incomplete LES relaxation, increased LES tone, and lack of peristalsis of esophagus. Diagnosis is reached with esophageal manometry and barium swallow radiographic studies. Permanent relief is brought by Esophageal dilatation and surgical cleaving of the muscle (Heller myotomy).

140. Ans. (b) Normal peristalsis

Ref: Bailey & Love, 26th ed. Ch. 62/1014

- Achalasia is a rare disease caused by loss of inhibitory ganglion cells within the esophageal myenteric plexus

FMGE SOLUTIONS

Extra Mile

- **Driven snow appearance -** Pindborg's tumor
- **Sunray appearance** - Osteogenic Sarcoma, Ewing Sarcoma
- **Floating Water Lily sign -** Lung Hydatid, Echinococcus
- **Popcorn calcification -** Pulmonary Hamartoma
- **Honeycomb appearance** - RA, Scleroderma, Interstitial Lung Disease
- **Egg shell calcification** - Sarcoidosis, Silicosis, Lymphoma, T.B., Histoplasmosis
- **Spring water cyst** = Pluero Pericardial cyst
- Rib notching - Neurofibromatosis, Aortic Aneurysm, Taussig-Bing Operation, Aortic obstruction, Coarctation of aorta.
- **Coeur en Sabot, Flask shape heart -** TOF
- **Candle wax sign -**Melorheostosis
- **Football Sign** - Pneumoperitoneum
- **Thumb Print Sign** - Epiglotis, Ischemic Colitis
- **Double bubble sign** - Duodenal Atresia
- **Single bubble sign -** Pyloric stenosis
- **Soap bubble appearance -** Meconium ileus
- **Meniscus appearance -** CBD stone on cholangiography
- **Central dot sign -** Caroli's disease
- **Chain of lakes appearance** - Chronic pancreatitis
- **Spongy appearance with central sunburst calcification sign** - serous cyst adenoma
- **Rim sign in IVP** - Hydronephrosis
- **Cobra head deformity** - Ureterocele
- **B/L spider leg sign** - Polycystic Kidney
- **Golf hole ureter** - T.B.
- **Flower Vase pattern of pelvis in IVP** - Horse shoe kidney

374. Ans. (b) Ureterocele

Ref: Bailey & Love, 26th ed. pg. 1285

A ureterocele is a congenital saccular dilatation of terminal portion of the ureter. The most common presentation is that of urinary tract infection or uro-sepsis in children. Stasis of urine can lead to calculus formation. Some children may present with palpable mass due to hydro nephrotic kidney .Cyst may prolapse into internal urethral opening causing obstruction to bladder outflow. This condition may remain unrecognized until adult life. Ureterocele is usually discovered on radiological examination or during endoscopy.

375. Ans. (a) Leydig cells

Ref: Bailey & Love, 26th ed. pg. 1341

Rectangular, crystal-like inclusions, composed of protein, with pointed or rounded ends in the interstitial cells of the testis (Leydig cells) and hilus cells in the ovary. *Inside the Leydig cells of human males can be found Reinke's crystals.* The purpose of these crystals is uncertain, some believe that they are a by-product of a degenerative process related to aging. They appear to have no contribution to androgen or testosterone production, and they *can be used to identify Leydig cells easily when viewing testicular tissue under a microscope.*

Question 119

A young adult presented to OPD with the complaint of mass in the testis. An orchidectomy was performed.Which among the following has the best prognosis? *(FMGE JULY 2024)*

a. Seminoma
b. Teratoma
c. Yolk sac tumor
d. Leydig cell tumor

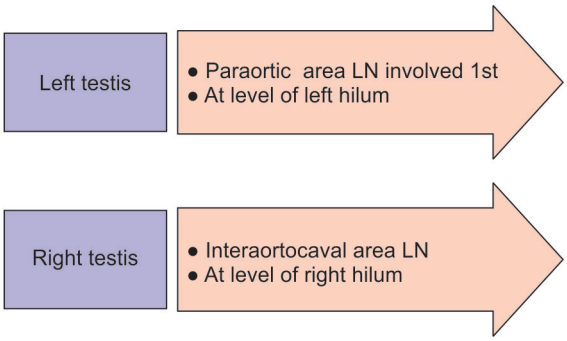
376. Ans. (a) Seminoma

Ref: Bailey & Love, 26th ed. pg. 1385

Seminoma is the most common germ cell tumor of the testis or, more rarely, the mediastinum or other extra-gonadal locations. It is a malignant neoplasm and is one of the most treatable and curable cancers, with a survival rate above 95% if discovered in early stages.

377. Ans. (b) Para aortic

Ref: Harrison, 19th ed. pg. 589



Points to Remember about testicular tumor

- **In** metastatic disease-Retroperitoneal LN is **Most commonly** involved
- **Metastasis**- Lymphatic >> Blood (m/c lung)
- **Exception is Choriocarcinoma where blood metastasis (m/c lung)** >> lymphatic metastasis.
- **Most common testicular tumor- in general** → seminoma
  - Prepubertal adults- Teratoma
  - Infant and children- Yolk sac tumor
- **Most common presentation**- nodule or painless swelling of one gonad
- Most common bilateral testicular tumor- **Malignant lymphoma**
- Most common bilateral primary testicular tumor Seminoma
- FNAC contraindicated
- **Initial IOC**- USG (hypo echoic area within tunica albuginea is suspicious)
- HPE diagnosis by-radical orchiectomy (inguinal approach)
- **Scrotal orchiectomy**- contraindicated
- **Chavesseac maneuver**- soft clamp applied to cord → biopsy from suspicious area → sent for frozen section → if + ligate cord, do orchiectomy → final HPE

378. Ans. (a) P.S.A

Ref: Bailey & Love, 26th ed. pg. 1341

496. Ans. (d) Exploratory laparotomy

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 372

The following case is suggestive of hemoperitoneum in the patient following RTA.

- Hemodynamically unstable trauma patients with hemoperitoneum should undergo exploratory laparotomy without any delay.

497. Ans. (a) Cardiac tamponade

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 367

The image shows Hemopericardium that would cause cardiac tamponade.

- Because of the pressure the heart can't beat correctly, causing a drop in blood pressure. If not treated, it is always fatal.
- The classic signs of Beck's triad include low blood pressure, distension of the jugular veins and decreased or muffled heart sounds on cardiac auscultation.

498. Ans. (b) E2M3V3

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 325

TABLE: Glasgow coma scale

Behavior	Response	Score
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score	Best response	15
	Comatose client	8 or less
	Totally unresponsive	3

499. Ans. (b) Tension pneumothorax

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 366

Features suggestive of Tension pneumothorax are:

- Deep Sulcus sign
- Absent vascular shadows
- Contralateral shift of the mediastinum
- Depression of the hemidiaphragm

500. Ans. (b) Perforation peritonitis

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 210

The imaging diagnosis of bowel perforation almost always relies on seeing pneumoperitoneum.

- Free gas under the diaphragm is a classic sign of pneumoperitoneum on the erect chest and abdomen radiographs and it is suspicious for bowel perforation.

501. Ans. (a) I 131

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 804

I-131 scan is an important imaging tool to aid the diagnosis and treatment of multiple thyroid disorders. Particularly pre-therapy and post-therapy scan in differentiated thyroid cancer patients allows surveillance of the disease and guide the clinician for the treatment plan.

- I-131 radiotherapy is a treatment for thyroid cancer that typically follows surgery to remove the thyroid.

502. Ans. (a) 18F

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 200

Question 120

A patient following a road traffic accident presented with subcutaneous emphysema. On auscultation, there was no air entry on the right side. Vitals were unstable. What will be your immediate management? *(FMGE JULY 2024)*

a. Insertion of wide bore needle in the 5th intercostal space
b. Wide bore needle decompression and IV fluids
c. Intubation and positive pressure ventilation
d. eFAST

503. Ans. (c) Chest tube insertion on right side

Ref: Bailey and love 27th ed. pg. 919

The CXR shows a hyper-translucent lung with absent vascular markings on right side. The diagnosis is right sided pneumothorax. This will require an ICD in 5th intercostal space on right side. There is also evidence of mediastinal shift.

504. Ans. (b) Keloid

Ref: Bailey and Love 27th ed. pg. 31

- The image shows a keloid over sternum. It is present at its usual site which is in area between xiphisternum and two shoulder tips.
- Atrophic scar is pale, flat and stretched which the image shows excessive tissue.
- Hypertrophic scare does not extend beyond the boundary of original incision while the image shows a scar extending outside the original incision site.

Question 121

Which of the following is characteristic of hypovolemic shock? Increase cardiac output *(FMGE JULY 2024)*

a. High vascular resistance
b. Increase Venous pressure
c. Increased mixed venous saturation
d.

506. Ans. (c) Hypovolemic

Ref: Bailey and Love 27th ed. pg. 14

- Since the patient is having bleeding and has CVP on lower side of normal he is having Hypovolemic shock. Normal CVP is 2-10 cm of Water.
- Option A is seen post MI. Option B is seen in spinal Shock/trauma to spinal cord. Option D is seen in anaphylaxis, septic shock and spinal cord injury.
- Spinal cord injury will reduce sympathomimetic outflow leading to it being an example of both neurogenic and distributive shock.

Cardiovascular and metabolic characteristics of shock				
	Hypovol-aemia	Cardio-genic	Obstruc-tive	Distrib-utive
Cardiac output	Low	Low	Low	High
Vascular resist-ance	High	High	High	Low
Venous pressure	Low	High	High	Low
Mixed venous saturation	Low	Low	Low	High

Extra Mile

Endocrine Shock
It is a combination of hypovolemic, cardiogenic or distributive shock. Important causes include hypo or hyperthyroidism and adrenal insufficiency.
Hypothyroidism causes a shock state similar to neurogenic shock due to disordered vascular and cardiac responsiveness to circulating catecholamines.

507. Ans. (c) Chest X-ray

Ref: Bailey and Love 27th ed. pg. 287

- The main advantage of a post procedure (central line insertion) CXR is to detect malposition, kinking of catheter and pneumothorax.
- Only transesophageal echocardiography can accurately detect a CVC tip in relation to superior vena cava and right atrium but its availability as a bedside tool is limited to major hospitals.
- Intraoperative monitoring of CVP is done via central line in Internal Jugular vein or subclavian vein.

508. Ans. (c) Orange

Ref: Emergencies in Anesthesia 3rd ed. pg. 483

- For resuscitation, greatest flow is through a short wide gauge cannula. Two 14G orange cannula in large forearm or antecubital fossa veins are recommended. If not available then grey 16G or white 17G cannula can be used.
- Blue cannula is used in pediatrics. Green cannula is used for routine fluid infusion or Blood transfusions in male patient.

509. Ans. (d) Carbuncle

Ref: SRB 5th ed. pg. 47

The image shows a suppurative collection with *multiple sieves* with discharging pus. This is a carbuncle and the sieves may fuse together to form a central necrotic ulcer. It is an infective gangrene of skin and subcutaneous tissue and occurs on nape of neck and back.

510. Ans. (c) Hypertonic saline

Ref: Harrison 20th ed. pg. 2077

Hypotonic fluids should not be given in case of severe head injury as they will worsen the brain swelling. It is *hypertonic fluids* like 3% saline or mannitol that will reduce the cerebral edema in cases of raised Intracranial pressure.

511. Ans. (c) Exploratory laparotomy

Ref: Bailey and Love 27th ed. pg. 1051

- The CXR shows evidence of gas under diaphragm implying perforation peritonitis. The patient will need an urgent exploratory laparotomy.
- Option a and b are done for focal fluid/pus collections while Option d would be required in sigmoid volvulus.

512. Ans. (b) Red – Yellow – Green – Black

Ref: Bailey and Love 27th ed. pg. 412

- Red = Most critically injured that need immediate treatment right now
- Yellow = Less critical need urgent treatment within hours
- Green = No limb or life-threatening injury so likely to survive if treatment is delayed by hours or days
- Black = Moribund patient, non-breathing or pulseless

559. Ans. (a) 0.5 mEq

Since 3% NaCl has 513 mEq/L of Na and Cl in 1000 ml, mathematically the answer will be 0.5 mEq.

	Size (mL)	Composition (g/L)	Ionic concentration (mEq/L)		Osmolarity (mOsmol/L)	pH
		Sodium chloride USP (NACL)	Sodium	Chroride		
3% sodium chloride injection, USP	500	30	513	513	1027	50 (4.5 to 7.0)
5% sodium chloride injection, USP	500	50	856	856	1711	5.0 (4.5 to 7.0)

* Normal physiological osmolarity range is approximately 280 to 310 mOsmol/L. Administration of substantially hypertonic solutions (> 600 mOsmol/L) may cause vein damage

Question 122

A case of accidental burn injuries in a female patient aged 35 year involving Right upper limb, Entire Right lower limb, Entire front and back of abdomen. Percentage of burn injuries according to rule of nine? *(FMGE JULY 2024)*

A. 45%
B. 60%
C. 28%
D. 70%

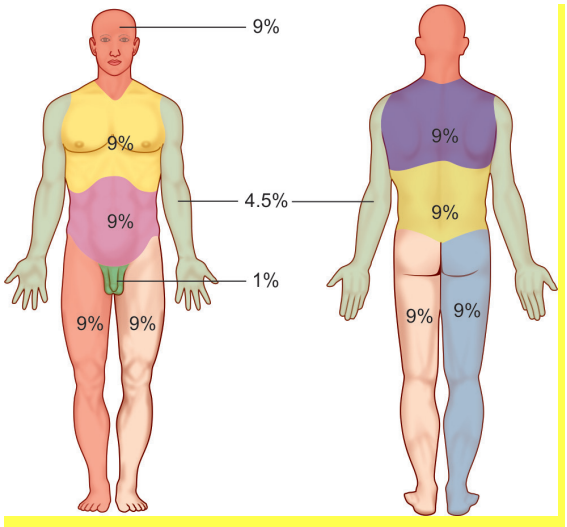
561. Ans. (a) 1%

Ref: Sabiston, 9th ed. pg. 523

- *This was a confusing question, as most students marked it as 9%, which is true for upper extremity but NOT for hand.*
- *Bailey in 26th ed. clearly mentions hand as palm and counting it as 1%*

Burn size is assessed by Wallace rule of nines (By Alfred Russel Wallace)

- Each upper extremity: 9%
- Head and neck: 9%
- Lower extremities: 18%
- Anterior and posterior aspects of the trunks: 18%
- Perineum and genitalia: 1%



562. Ans. (a) 1%

Ref: Sabiston, 19th ed. pg. 523

Perineum involved in burns is 1% of body surface area.

563. Ans. (b) Ringer's lactate

Ref: Sabiston, 19th ed. pg. 529-30

- **IV fluid resuscitation is immediately required:** In children with burn >10% TBSA and adult with burn >15% TBSA
- Maximum fluid is given in first 8 hours (50%) rest of the fluid will be given in subsequent hours (25% + 25% in next 16 hours).
- **Most commonly used/preferred fluid: Ringer lactate** (Crystalloids). Because it is a relatively isotonic crystalloid solution that is the key component of almost all resuscitative strategies, at least for the first 24-48 hours.
- However, some centers use human albumin, FFP or hypertonic saline.
- RL is preferable to isotonic sodium chloride solution (ie, normal saline [NS]) for large-volume resuscitations because ***its lower sodium concentration (130 mEq/L vs 154 mEq/L) and higher pH concentration (6.5 vs 5.0) are closer to physiologic levels.***
- **Hypotonic fluid is not given, as it can lead to hyponatremia and water intoxication.**
- **Maintenance fluid in children:** Dextrose –saline

Extra Mile

- Hypertonic saline has been effective in treating burn shock as it produces hyperosmolarity and hypernatremia
- This reduces the shift of intracellular water to the extracellular space

564. Ans. (a) Hypotonic solutions

Ref: Sabiston, 19th ed. pg. 530-33

565. Ans. (a) Crystalloids

Ref: Bailey & Love, 26th ed. pg. 392

Question 123

Bleeding vessel in Extra dural hemorrhage?

(FMGE JULY 2024)

a. Middle Meningeal artery leading bleeding in Epidural space
b. Bridging veins leading to bleeding in epidural space
c. Circle of Willis leading bleeding in Subarachnoid space
d. Anterior Cerebral artery leading to bleeding in Subdural space

Extradural hematoma/epidural hematoma, is a collection of blood that forms between the inner surface of the skull and outer layer of the dura, which is called the endosteal layer.

- The source of bleeding is usually arterial, most commonly from a torn middle meningeal artery.
- They are usually associated with a history of head trauma and frequently associated skull fracture and history of lucid interval.

603. Ans. (b) Mannitol

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 336

Mannitol is the most popular osmotic agent. Osmotic therapy using mannitol reduces ICP by mechanisms that remain unclear.

- Mannitol is thought to decrease brain volume by decreasing overall water content, to reduce blood volume by vasoconstriction, to reduce CSF volume by decreasing water content.

604. Ans. (a) Bruising on mastoid

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 362

Battle sign is bruising over the mastoid process that is typically the result of head trauma.

- It requires significant head trauma and may indicate significant internal injury to the brain and not just the posterior cranial vault or mastoid. Basilar skull fracture is one of the leading causes.

605. Ans. (b) Extradural hematoma

Ref: Bailey and Love, Textbook of Surgery, 27th ed. pg. 333

Extradural hematomas are seen on CT scans of the brain. They are typically bi-convex (or lentiform) in shape, and most frequently beneath the squamous part of the temporal bone.

- EDHs are hyperdense, somewhat heterogeneous, and sharply demarcated.
- When acute bleeding is occurring at the time of CT scanning the non-clotted fresh blood is typically less hyperdense, and a swirl sign may be evident.

606. Ans. (c) Meningioma

Ref: Bailey and Love 27th ed. pg. 480

The image shows round lamellated calcified lesion psammoma bodies in brain biopsy specimen of a patient with intracranial space occupying lesion. It is seen in Meningioma. This lamellated concentric calcification occurs around necrotic tumor cells and is an example of dystrophic calcification.

Psamomma bodies are seen in (Mnemonic- **PSM-A**)

- **P**apillary thyroid carcinoma
- **P**apillary serous carcinoma of endometrium
- **S**erous cystadenoma of ovary
- **M**eningioma
- **M**esothelioma
- **A**denocarcinoma lung

607. Ans. (d) Diffuse axonal injury

Ref: Bailey and Love 27th ed. pg. 336

- The NCCT shows punctuate hyper-densities at junction of Grey and white matter in a unconscious patient with posturing. This is a feature of Diffuse Axonal injury. In lot cases CT can be normal as well.
- Option a is ruled out as no blood is seen in Slyvian fissure.
- Option b is ruled at no concavo-convex hyper-density is seen
- Option c is ruled out as it causes weakening of wall of blood vessels and causes intraparenchymal bleeding.

MISCELLANEOUS

608. Ans. (b) Needle thoracostomy

Ref: Harrison 20th ed. pg. 2200

The CXR shows left sided pneumothorax due to absence of vascular shadows, collapsed lung border visible. The air at positive pressure will lead to mediastinal shift and compression of great veins. This leads to low BP and needs intervention in form of wide bore needle decompression followed by chest tube insertion.

609. Ans. (c) Right Empyema

Ref: Bailey and Love, 27th ed. pg. 922

The first image shows collapse of right lung due to effusion/empyema. Post Chest ICD drainage the lung has re expanded but shows underlying consolidation/re-expansion pulmonary procedure.

610. Ans. (b) Internal mammary artery

Ref: Bailey and Love, 27th ed. pg. 890

Atherosclerosis can develop in bypass grafts as well and patients may require a re-do CABG. The patency rates of 98 percent have been reported since 1980s for LIMA/internal thoracic artery to LAD.

83. Ans. (b) ABR

Question 124

What is the most commonly used test for newborn hearing screening? *(FMGE JULY 2024)*

a. Otoacoustic Emissions (OAE)
b. Brainstem Evoked Response Audiometry (BERA)
c. Pure Tone Audiometry (PTA)
d. Tympanometry

84. Ans. (b) Cochlea

Ref: Dhingra's ENT, 6th ed. pg. 27

Otoacoustic emission test will determine cochlear, hair cell function. It is used for:

- Screening neonates exposed to aminoglycoside antibiotics.
- Differentiating sensory and neural components of sensori-hearing loss.
- Test for feign (maligned) hearing loss.
- To differentiate cochlear vs retrocochlear hearing loss

Note: *Sedation does not interfere with OAE test.*

85. Ans. (d) Acoustic neuroma

Ref: Dhingra's ENT 6th ed. pg. 450

- **Tone decay** also known as auditory fatigue, is a change in auditory threshold when a continuous tone is presented to the ear.
- It is seen in **acoustic neuroma** and other retrocochlear lesion.

86. Ans. (a) Otosclerosis

Ref: Diseases of ENT, by Dhingra, 6th ed. pg. 22-23

- Gelle's test is a Tuning fork test which can be performed using tuning fork of different frequencies such as: 128, 256, 512, 1024, 2048, 4096 Hz.
- MC used/ideal for routine clinical practice is of **512 Hz**.
- **Tests done with tuning fork:**
  - Rinne's test
  - Weber's test
  - Absolute bone conduction (ABC) test
  - Bing test
  - Gelle's test
  - Lewis test

Points to know about Gelle's test

- Gelle's test is a bone conduction test and examines effect of increased air pressure in ear canal (*using siegel's speculum*) on hearing.
- This test is performed by placing a vibrating tuning fork on mastoid, while changes in air pressure in the ear canal are brought about by siegel's speculum.
- In normal individuals, increased air pressure in ear canal, pushes tympanic membrane inwards which raises intralabyrynthine pressure → immobility of basilar membrane → decreased hearing **(POSITIVE TEST)**.
- In patients with fixed ossicular chain (otosclerosis) or disconnected ossicular chain, there is no change in hearing **(NEGATIVE TEST)**.

Note: *Earlier it was a popular test for otosclerosis. Now it is superceded by tympanometry.*

Contd...

87. Ans. (b) CSOM

Ref: Diseases of ENT, by Dhingra, 6th ed. pg. 22

TABLE: Tests done with help of tuning fork and their interpretation

Rinne's is a tuning fork test, which is done to test the air conduction and bone conduction.
It is done by placing the tuning fork on mastoid (Bone conduction) followed by bringing it in front of ear canal (air conduction).
In normal individual and in SNHL sound is still heard when tuning fork is brought in front of ear canal (**AC > BC → Positive Rinne**)
In patients with conductive hearing loss, sound transmitted via bone conduction (mastoid) is more as compared to air conduction **(BC > AC → Negative Rinne)**.
All the given conditions in options causes sensorineural hearing loss, except the CSOM, which causes conductive hearing loss.

88. Ans. (c) Left ear, air conduction

Ref: Diseases of ENT, by Dhingra, 6th ed. pg. 30

Symbols and Lines used in Audiogram

- Broken line for bone conduction (Mn: B–B)
- Continuous line for air conduction
- Red line for right ear (Mn: R–R)
- Blue line for left ear

TABLE: Symbols used in Audiogram charting

Test modality	Right ear	Left ear
AC unmasked	○	X
AC masked	△	□
BC unmasked	<	>
BC masked	[	]

89. Ans. (b) 512 Hz

Ref: Dhingra's ENT, 5th ed. pg. 26

- Tuning fork test can be performed using tuning fork of different frequencies such as: 128, 256, 512, 1024, 2048, 4096 Hz.
- MC used/ideal for routine clinical practice is of 512 Hz.

198. Ans. (a) Atrophic rhinitis

Ref: Dhingra, 5th ed. pg. 170

ATROPHIC RHINITIS (OZAENA)

- **Etiology** (Remember Mnemonic HERNIA)
  - **H**ereditary factors
  - **E**ndocrinal disturbance: Disease usually starts at puberty, involves females more than males.
  - **R**acial factors: White and yellow races are more susceptible than equatorial African natives.
  - **N**utritional deficiency. Disease may be due to deficiency of vitamin A, D or iron
  - **I**nfective.
    - **Kelbsiella ozaenae: Most common cause**
    - Diphtheroids, P. vulgaris, E. coli, staphylococci and Streptococci

Clinical Features

- Foul smell from the nose
- **Merciful anosmia**
- **Nasal obstruction:** *Due to large crusts filing the nose*
- Epistaxis: May occur when the crusts are removed

Treatment

Medical: Nasal irrigation and removal of crusts by Alakaline Douche - **Best Treatment**

- **Alakaline nasal douche** is prepared from **(in ratio of 1:1:2):**
  - Sodium bicarbonate
  - Sodium biborate
  - Sodium chloride

Surgical

- **Young's operation:** Both the nostrils are closed completely just within the nasal vestibule by raising flaps. They are opened after 6 months.
- **Modified young operation:** To avoid the discomfort of bilateral nasal obstruction, modified Young's operation aims to partially close the nostrils.

199. Ans. (d) Crusting

Ref: Dhingra, 5th ed. pg. 170

Please refer to above explanation

200. Ans. (b) Lymphadenopathy

Ref: Dhingra's ENT, 6th ed. pg. 446-47

NASOPHARYNGEAL CARCINOMA

- Nasopharyngeal carcinoma is caused by **Ebstein Barr virus (EBV).**
- It is seen most commonly in Chinese population or South East Asian peoples.

Question 125

the most common location of Nasopharyngeal carcinoma? *(FMGE JULY 2024)*

a. ET
b. Fossa of rosenmuller
c. Torus tubarius
d.

- Most common site of nasopharyngeal carcinoma: **Fossa of Rosenmuller**.
  - This is a pyramidal shaped fossa on the lateral wall of nasopharynx.
- The most common type of nasopharyngeal carcinoma is undifferentiated carcinoma of nasopharyngeal type.

Clinical Presentation

- The most common presentation is cervical lymphadenopathy.
- **Other important presentations are**
  - Nasal obstruction
  - Nasal bleeding
  - Unilateral glue ear in adult leading to conductive hearing loss.
  - Cranial nerve palsies. *All the nerves from 3rd to 12th may be involved.*
- **Trotter's triad** seen in case of nasopharyngeal carcinoma. It is also called Sinus of Morgagni Syndrome.
  - Ipsilateral soft palate palsy
  - Conductive hearing loss
  - Trigeminal neuralgia.

201. Ans. (b) Rhinoscleroma

Ref: Dhingra's ENT, 5th ed. pg. 172

RHINOSCLEROMA

- Caused by gram negative coccobacillus- Klebsiella Rhinoscleromatis.
- **It passess through 3 stages:** Catarrhal, Granulomatous and Cicatricial.
- It causes woody infiltration of upper lip, so it is also known as Woody Nose.
- Upon biopsy characteristic cells seen are: Miculicz's cell and Russel Bodies.
- Tx: Streptomycin (1 g/day) and tetracycline (2 g/day) are given together for 4-6 weeks.

RHINOPHYMA

- It is due to hypertrophy of sebaceous glands of nasal tip.
- Associated with Acne Rosacea.
- Nose becomes big and ugly, hence also known as Potato Nose.

RHINOLITH

- It is old, calcified foreign body in nose.
- Present with foul smelling, one sided yellowish nasal discharge.

RHINOSPORIDIOSIS

- Caused by Rhinosporidiosis Seeberi
- *Present as strawberry/mulberry polyp in the nose.*

Question 126

45-year-old woman presents with progressive hearing loss that has been worsening over the past few years. Audiometry confirms conductive hearing loss, and a diagnosis of otosclerosis is made. What is the preferred surgical treatment for her condition? *(FMGE JULY 2024)*

a. Stapedectomy
b. Stapedotomy
c. Tympanoplasty
d. Cochlear implant

22. Ans. (d) Tympanotomy with stapedectomy

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 95-98

- Otosclerosis is an abnormal bone growth in the middle ear that causes hearing loss. The stapes begins to fuse with the surrounding bone, eventually becoming fixed so it cannot move.
- Pregnancy is not a cause but may make the condition worse, so symptoms are commonly first noticed during pregnancy.
- The most common operation that is done is to replace the stapes with an artificial bone made of plastic or metal. The operation is called a stapedectomy.

23. Ans. (c) Arnolds nerve

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 5

- A recurrent syncopal attack provoked by light stimulation of the external auditory canal is due to auricular branch of vagus nerve stimulation. The auricular branch of the vagus nerve is often termed as Arnold's nerve.

24. Ans. (c) Newborns are obligatory nasal breathers

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 157

- Human infants are commonly described as obligate nasal breathers as they breathe through their nose rather than the mouth.
- Most infants, however, are able to breathe through their mouth if their nose is blocked.

25. Ans. (a) Malignant otitis externa

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 55

- Malignant external otitis (MEO) is an infection that affects the external auditory canal and temporal bone.
- The causative organism is usually Pseudomonas aeruginosa, and the disease commonly manifests in elderly patients with diabetes.

26. Ans. (b) Anterior belly of digastric muscle

Ref: Diseases of ENT, by Dhingra, 6th ed. pg. 285

TABLE: Derivatives of branchial/pharyngeal arches

1st Branchial arch	2nd Branchial arch	3rd Branchial arch	4th Branchial arch	6th Branchial arch
• Malleus and Incus • Maxilla • Mandible • Muscle of mastication • Anterior belly of digastric muscle • Tensor tympani muscle • Sphenomandibular ligament	• Stapes (except foot plate) • Upper half of body of hyoid • Lesser cornu of hyoid • Muscle of facial expression • Posterior belly of digastric muscle • Stylohyoid ligament	• Lower part of body of hyoid • Greater cornu of hyoid • Stylopharyngeus muscle • Common carotid artery	• Upper thyroid cartilage • Cricothyroid muscle • Extrinsic laryngeal and pharyngeal muscle	• Lower half of thyroid cartilage • Arytenoid cartilage • All intrinsic laryngeal muscle except cricothyroid
Nerve: Mandibular branch of CN 5th	**Facial Nerve**	**Glossopharyngeal nerve**	**Vagus + Superior Laryngeal nerve**	**Vagus + Recurrent laryngeal nerve**

Note: *Laryngeal cartilage like cricoid, coneiform, corniculate are formal due to fusion of Branchial arch 4 and 6.*
Epiglottic cartilage derived from hypobranchial eminence.

d. Watchful waiting

- **Adenoids**, also known as **pharyngeal tonsil**, or **nasopharyngeal tonsil**, are located at the back of the throat, above the tonsils, and are small lumps of tissue.
- They form part of the immune system of babies and young children.
- In case of their hyperplasia, there are several difficulties faced by patients like rhinousinusitis, mouth breathing, snoring etc.
- Adenoidectomy is surgical removal of adenoids to overcome those problems.

Indications and Contraindications of Adenoidectomy

Indications	Contraindications
• Adenoid hypertrophy causing snoring • Mouth breathing sleep apnea syndrome or speech abnoramlities, i.e. (rhinolalia clausa) • Recurrent rhinosinusitis • Chronic secretory otitis media	• Cleft palate or submucous palate • Removal of adenoids causes velopharyngeal insufficiency in such cases • Haemorrhagic diathesis • Acute infection of

Question 127

What is the preferred management for a pediatric patient with symptomatic adenoid hypertrophy causing chronic nasal obstruction, hearing loss and sleep apnea? *(FMGE JULY 2024)*

a. Adenoidectomy
b. Adenoidectomy with grommet insertion
c. Antibiotic therapy
d. Watchful waiting

144. Ans. (b) Serous otitis media in children

Ref: Dhingra, 5th ed pg. 71-72

- Serous otitis media is also known as Glue ear.
- It is an insidious condition characterized by accumulation of non-purulent effusion in the middle ear cleft.
- One of common causes of serous otitis media (Glue ear) in children is blockage of Eustachian tube secondary to adenoid hyperplasia.
- Therefore, the treatment aims at removal of adenoid (adenoidectomy) and drainage of middle ear by grommet.
  - Grommet is a small tube inserted in tympanic membrane to drain the middle ear.
- Serous otitis media in adults should arouse suspicion of nasopharyngeal carcinoma and hence the treatment aims at removal of carcinoma.
- Adenoiditis is an acute condition and requires treatment conservatively.

145. Ans. (b) Adenoidectomy

Ref: Dhingra's ENT, 6th ed. pg. 431-32

Please refer to the previous question for explanation.

146. Ans. (b) Temporalis fascia

Ref: Dhingra's ENT, 6th ed. pg. 29-30, 400

- Tympanoplasty is repairing of tympanic membrane in cases of ruptured tympanic membrane either due to infection or trauma.
- Temporalis fascia is used for tympanoplasty. It has very low basal metabolic rate, hence very high rate of survival of graft.

147. Ans. (a) Round window

Ref: Dhinga's ENT, 5th ed. pg. 138

- Cochlear implant is an electronic device that can provide useful hearing and improved communication abilities for a person with profound sensorineural hearing loss.
- **Cochlear implant consists of two components:**
  1. **External component:** Include external speech processor and a transmitter. Speech processor may be body worn or behind the ear type.
  2. **Internal component:** It is surgically implanted and comprises the receiver/stimulator package with an electrode array. Electrode array is **passed via round window** and is ***inserted into the cochlea (scala tympani) deeper in skull.***

NOSE AND PARANASAL SINUSES

148. Ans. (a) Amphotericin B

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 178

- Mucormycosis is a serious fungal infection caused by a group of molds, called mucormycetes.
- Mucormycosis needs to be treated with prescription antifungal medicine, usually amphotericin B, posaconazole, or isavuconazole.

149. Ans. (d) Meniere's disease

Ref: Diseases of Ear, Nose and Throat and Head and Neck Surgery, Dhingra, 7th ed. pg. 111

- Meniere's disease is a disorder of the inner ear that can lead to vertigo and hearing loss. In most cases, Meniere's disease affects only one ear.
- Symptoms of Meniere's disease appear to be the result of an abnormal amount of endolymph in the inner ear.

- Trotter's triad: CHL, soft palate palsy, deep facial pain
- Diplopia, nasal dysfunction, headache, etc.
- WHO classification on basis of histopathology

Question 128

What is the preferred initial management for a patient presenting with cerebrospinal fluid (CSF) rhinorrhea?

(FMGE JULY 2024)

a. a. Steroid + Functional Endoscopic Sinus Surgery (FESS) |
b. Antibiotic therapy with acetazolamide
c. Bed rest with head elevation and avoidance of straining activities
d. Immediate surgical repair without initial medical management

173. Ans. (c) CSF Rhinorrrhea

Ref: Dhingra's ENT 6th ed. pg. 305

- It is a case of CSF rhinorrhea due to cribriform plate fracture.
- Cribriform plate, which is a thin plate of bone, forms the roof of nose. In patients with trauma, there is clear watery nasal discharge with or without blood tinged.
- **Causes of CSF rhinorrhea:**
  - Trauma: Most common cause
  - Surgical: During FESS, transphenoidal surgery
  - Neoplasm invading the skull base
  - Infection and mucoceole of sinuses eroding bone and dura
  - Congenital: Meningocoele, meningoencephalocoele and glioma with skull base defect
- **Symptoms:**
  - Clear watery nasal discharge which cannot be sniffed back
  - Reservoir sign: When rising in morning CSF collected in sinuses on bending head.
  - Handkerchief sign: Handkerchief stiffens if it is due to nasal discharge due to its mucus content.
- **Investigation:**
  - Beta 2 transferrin: Most sensitive and specific.
  - HRCT: IOC
  - MRI: To locate site of leak and if any associated CNS pathology.
- **Treatment:**
  - Conservative treatment along with prophylactic antibiotics.
  - Surgical repair if there is no relief from conservative management.

174. Ans. (c) Ammonia irritates trigeminal nerve

Ref: Physical Medicine and Rehabilitation, 4th ed. pg. 12

- The patient here is presenting with history of trauma, which can cause damage to olfactory nerve → leading to anosmia.
  - MC cranial nerve damaged in head trauma: Olfactory nerve
- Remember, for olfaction system two separate nerves are responsible:
  - CN I: Responsible for perception associated with quality of odour
  - CN V: Produces sensation of irritation or pungency
- Odour sensation from olfactory nerve usually do not produce physiological response. But sensation from trigeminal nerve can produce response such as runny nose, red eyes, sneezing when an irritant like ammonia/ vinegar is detected.

175. Ans. (a) CSF rhinorrhea

Ref: Dhingra's ENT 6th ed. pg. 305

- It is a case of CSF rhinorrhea due to cribriform plate fracture.
- Cribriform plate, which is a thin plate of bone, forms the roof of nose. In patients with trauma, there is clear watery nasal discharge with or without blood tinged.
- **Symptom:**
  - Watery nasal discharge which cannot be sniffed back.
- **Investigation:**
  - **Beta 2 transferrin:** Most sensitive and specific.
  - **HRCT:** IOC.
  - **MRI:** To locate site of leak and if any associated CNS pathology.
- **Treatment:**
  - Conservative treatment along with prophylactic antibiotics
  - Surgical repair if there is no relief from conservative management.

176. Ans. (b) Atrophic rhinitis

Ref: Dhingra's ENT 6th ed. pg. 154

- Atrophic rhinitis is the chronic inflammation of nose characterized by atrophy of nasal mucosa and turbinate bone. This makes the nasal cavity roomy and filled with foul smelling nasal crust.
- **Pathology:** Ciliated columnar epithelium is lost and is replaced with stratified squamous type of epithelium.
- **Treatment:**
  - Alkaline nasal douching using Na^+ bicarbonate, Na^+ biborate and NaCl.
  - Followed by local application of 25% glycerin → it inhibits the growth of proteolytic organisms.
  - Antibiotics (streptomycin 1 g/day × 10 days)
  - Surgery:
    - **Young's operation:** Complete closure of both nostrils by nasal flaps.

Question 129

Which structure does the anterior ethmoidal sinus drain into? *(FMGE JULY 2024)*

a. Middle meatus
b. Inferior meatus
c. Superior meatus
d. Sphenoethmoidal recess

Ostia Opening in Meatuses

Meatus	Ostia
Supreme meatus/ Sphenoethmoidal recess	Sphenoid sinus ostia
Superior meatus	Posterior ethmoidal sinus ostia
Middle meatus	Has three ostias • Maxillary sinus • Frontal sinus • Anterior ethmoidal sinus
Inferior meatus	**Has no Ostia.** It has Nasolacrimal duct opening

Remember: Direction of nasolacrimal duct is ***downwards, backwards and outward***.

182. Ans. (a) Inferior meatus

Ref: Dhingra's ENT, 6th ed. pg. 187-88

- **Late**ral wall of the nose ***contains inferior meatus*** which has no ostia***, instead it has naso-lacrimal duct***. The nasolacrimal duct (sometimes called the tear duct) carries tears from the lacrimal sac into nasal cavity.
- Inferior nasal meatus is partially covered by a mucosal fold called **valve of Hasner** or *plica lacrimalis*).

183. Ans. (d) Inferior meatus of the nose

Ref: Dhingra's ENT, 6th ed. pg. 1 87-88

Refer to above explanation

184. Ans. (a) Middle meatus

Ref: Dhingra's ENT, 6th ed. pg. 173-75

- ANTROCHOANAL POLYP most commonly seen in children. They are unilateral, usually arises from the mucosa of maxillary antrum near its accessory ostium, comes out of it & grows in the chonaa and nasal cavity.
- Maxillary sinus opens into the middle meatus.

185. Ans. (a) Sphenoid sinus

Ref: Dhingra's ENT, 6th ed. pg. 138

- Spheno ethmoidal recess is situated above the superior turbinate. Sphenoid sinus opens into it.
- Sphenoid sinus. It has an anterior part and posterior part.
  - **Anterior part:** Roof related to the olfactory tract, optic chiasma, frontal lobe while the lateral wall is related to optic nerve, internal carotid artery and maxillary nerve.
  - **Posterior part:** Roof is related to the pituitary gland in the sella turcica while each lateral wall is related to cavernous sinus, internal carotid artery and CN 3rd and all division of 5th nerve.

186. Ans. (d) None of the above

Ref: Dhingra's ENT, 6th ed. pg. 138-40

- Please read the question carefully! The question is about the sinus opening.
- In inferior meatus there is no opening of any sinuses. *It has opening for nasolacrimal duct.*

187. Ans. (d) Posterior ethmoidal artery

Ref: Dhingra's ENT, 6th ed. pg. 147, Dhingra 4th ed. pg. 140

- Kiesselbach's area, aka Kiesselbach's plexus and Little's area, is an area on the nasal septum located on the antero-inferior part of the septum.
- In this area four arteries anastomose to form a vascular plexus called Kiesselbach's plexus.
- **The arteries are**
  1. Sphenopalatine artery (from the maxillary artery): **Main artery of plexus**
  2. Greater palatine artery (from the maxillary artery)
  3. Anterior ethmoidal artery (from the ophthalmic artery)
  4. Septal branch of the superior labial artery (from the facial artery)

Extra Mile

- Only artery of Kisselbach's plexus which is a branch of internal carotid artery: Anterior ethmoidal artery. The other three are branches of external carotid artery.
- Most common site of epistaxis: Kisselbach's area/Little's area
- **Artery of epistaxis: Sphenopalatine artery**
- **Posterior epistaxis is from:** Woodruf's plexus (very difficult to control)
- **Woodruf's Plexus:** Situated in the posterior part of meatus. Formed when sphenopalatine artery anastomosis with post-pharyngeal artery.

188. Ans. (c) Anterior ethmoidal artery

Ref: Dhingra's ENT, 6th ed. pg. 147-48

- Anterior and posterior Ethmoid artery is a branch of ophthalmic artery, which is derived from internal carotid artery.
- It is only anterior ethmoidal artery (of internal carotid) which contributes to little's area.
- **Branches from external carotid artery *(indirectly)* contributing to little's area:** Sphenopalatine artery, Greater palatine artery and superior labial artery.

189. Ans. (d) Hereditary hemorrhagic telangiectasia

Ref: Dhingra's ENT, 6th ed. pg. 176-77

126. Ans. (a) Reiter's syndrome

Ref: Apley's System of Orthopaedics, 9th ed. pg. 70

REITER'S SYNDROME

- It is a clinical **triad** of **urethritis, arthritis and conjunctivitis** occurring some weeks after either dysentery of genitourinary infection. It is now recognized that this is one of the classic forms of reactive arthritis, i.e. an aseptic inflammatory arthritis associated with non-specific infection.

Cause

- First-degree relatives and a close association with HLA-B27 point to a genetic predisposition.
- Gut pathogens include Shigella flexneri, Salmonella, Campylobacter species and Yersinia enterocolitica. Lymphogranuloma venereum and Chlamydia trachomatis have been implicated as sexually transmitted infections.

Clinical Features

Question 130

Most common joint involved in osteoarthritis?

a. Knee *(FMGE JULY 2024)*
b. Mtp
c. Mcp
d. DIP

127. Ans. (a) DIP

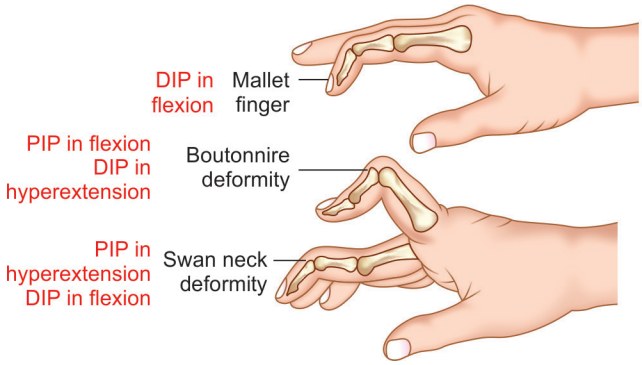
Ref: Maheshwari, 5th ed. pg. 287

- Rheumatoid arthritis characteristically causes swelling of small joints in the hand like the PIP, MCP and the wrist joint bilaterally.
- Isolated DIP joint involvement is seen in psoriatic arthropathy.
- DIP joint involvement is also seen with osteoarthritis but the involvement is with pain at the base of thumb. Knee joint is the commonest large joint involved in these patients.

128. Ans. (c) Flexion contracture of PIP and extension of DIP

Ref: Maheshwari, 5th ed. pg. 288

- **Boutonniere deformity** is a deformed position of the fingers or toes, in which the joint nearest the knuckle (PIP) is permanently bent toward the palm while the farthest joint (DIP) is bent back away ***(PIP flexion with DIP hyperextension).***
- It is commonly caused by injury or by an inflammatory condition like rheumatoid arthritis.



Extra Mile

- **'Z-deformity'** i.e. radial deviation of the wrist with ulnar deviation of the digits, often with palmar subluxation of proximal phalanges.
- **'Swan – neck deformity'** i.e. hyperextension of PIP joints with compensatory flexion of the distal interphalangeal joints.
- **Wind –** sweep deformities of toes i.e. valgus deformities of toes in one foot and varus in other, *(as wind sweeps all the structure in one direction).*

129. Ans. (b) Heberdens nodes

Ref: Harrison, 18th ed./ch. 332

- ***"Heberden's nodes are hard or bony swellings that develop in the distal interphalangeal joints (DIP) in a case of osteoarthritis"***

Clinical Features of Rheumatoid Arthritis

- The presenting symptoms of RA typically result from inflammation of the joints, tendons, and bursae.
- Early morning joint stiffness lasting more than 1 hour and easing with physical activity.
- The earliest involved joints are typically the small joints of the hands and feet. The initial pattern of joint involvement may be monoarticular, oligoarticular (<4 joints), or polyarticular (>5 joints), usually in a symmetric distribution.
- ***Wrists, metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints stand out as the most frequently involved joints.***
- **Frequent hallmark of RA:** Flexor tendon tenosynovitis.

Deformities

- Ulnar deviation of the hand.
- ***Swan-neck deformity:*** Hyperextension of the PIP joint with flexion of the DIP
- ***Boutonniere deformity:*** Flexion of the PIP joint with hyperextension of the DIP joint
- ***Z deformity:*** Radial deviation of wrist with ulnar deviation of digits, often with palmar subluxation proximal phalanges.

Extra Mile

- **Osteitis deformans**, also known as Paget's disease of bone, is a chronic disorder characterized by abnormal bone remodeling. It typically affects older individuals and presents with enlarged and deformed bones.
- **Osteopetrosis** is a rare genetic disorder characterized by increased bone density due to impaired bone resorption. It is typically present from birth and may lead to various complications.
- **Osteoporosis** is a condition characterized by decreased bone density and increased susceptibility to fractures. Osteoporosis may be associated with decreased vitamin D levels and is mostly seen in elderly patients.

7. Ans. (b) Osteoarthritis knees

Ref: Apley's System of Orthopaedics and Fractures, 10th ed. pg. 100

- The given clinical image shows features consistent with osteoarthritis of the knee joint.
- Osteoarthritis is a degenerative joint disease characterized by the breakdown of cartilage in the joints, leading to pain, stiffness, and swelling.
- It is commonly seen in older individuals and can be associated with factors, such as ageing, joint overuse, obesity, previous joint injuries, and genetic predisposition.
- The characteristic findings include joint space narrowing, osteophyte formation (bone spurs), and subchondral sclerosis (increased density of the bone beneath the cartilage) seen on imaging.
- Treatment options for osteoarthritis include pain management, physical therapy, lifestyle modifications, and in severe cases, surgical interventions such as joint replacement.

Note: Paget's disease is due to bone remodeling; RA presents symmetrically and involves multiple joints while gout mainly involves 1st MTP joint due to high uric acid levels.

8. Ans. (d) Enchondroma

Ref: Apley's System of Orthopaedics and Fractures, 10th ed. pg. 193

- The given X-ray shows a well-defined radiolucent lesion within the bone, which is consistent with an enchondroma.
- Enchondromas are benign cartilaginous tumors that typically arise within the medullary canal of the bone.
- They most commonly affect the small bones of the hand, causing pain and swelling in the affected area.
- Enchondromas usually have characteristic radiographic features, such as a well-defined radiolucent lesion with stippled calcifications (rings and arcs).
- Treatment depends on the size, location, and symptoms associated with the lesion, and options may include observation or surgical intervention.

Question 131

A 17 year old patient presents with a growth behind the heel on Talus as shown in the image below. Identify the condition?

a. Enchondroma *(FMGE JULY 2024)*
b. Osteosarcoma
c. Osteomyelitis
d. Osteochondroma

9. Ans. (a) Osteochondroma

Ref: Apley's System of Orthopaedics and Fractures, 10th ed. pg. 194

- The given X-ray shows a **bony outgrowth** with a **broad base** arising from the **metaphysis** of the **distal femur**, which is characteristic of an **osteochondroma**.
- Osteochondromas are the most common benign bone tumors, typically arising during skeletal growth.
- They consist of a bony stalk covered with a cartilage cap.
- Osteochondromas are usually asymptomatic, but they can cause pain, swelling, or mechanical symptoms when they impinge on surrounding structures.
- Treatment is usually observation, but surgical excision may be considered if symptoms are significant or if complications arise.

Other options:

- **Osteoblastoma** is a benign bone tumor that can cause localized pain, but it typically presents as a larger, more expansile lesion.
- **Osteoporosis** is a condition characterized by decreased bone density, which increases the risk of fractures.
- **Osteitis fibrosa cystica**, also known as von Recklinghausen's disease, is a manifestation of hyperparathyroidism and is characterized by cystic and fibrotic changes in bone.

10. Ans. (a) Colles fracture

Ref: Apley's System of Orthopaedics and Fractures, 10th ed. pg. 797

- The presence of a **dinner fork deformity** following a fall on an outstretched hand suggests a **Colles fracture**.
- A Colles fracture is a specific type of distal radius fracture, where the distal fragment of the radius is displaced dorsally (backward) and radially (outward), resulting in a characteristic deformity resembling a dinner fork after malunion.
- This type of fracture commonly occurs due to a fall onto an outstretched hand with an extended wrist.
- Treatment typically involves closed reduction (realigning the fractured bones without surgery) followed by immobilization with a cast or splint.

Extra Mile

- **Carpal tunnel syndrome** is a condition caused by compression of the median nerve in the wrist.
- **Osteoporosis** is a condition characterized by decreased bone density and increased susceptibility to fractures
- **Smith's fracture** is a type of distal radius fracture where the distal fragment is displaced palmarly (forward) and radially (outward), resulting in a reverse deformity compared to a Colles fracture.

FMGE SOLUTIONS

- **MC type of shoulder dislocation:** Anterior
- **Shoulder instability:** Head of the humerus is NOT stable in the glenoid. It can present with:
  - **Loose shoulder/minor shoulder instability:** Patient present with pain in shoulder upon using it. Pain occurs as a result of stretching of capsule, as the head moves out, without actual dislocation
  - **Frank dislocation:** Patient presents with abnormal movement of the head of humerus → partial movement → gets spontaneously reduced or dislocated
- **Mechanism of injury:**
  - **MC:** Fall on outstretched hand with the shoulder abducted and externally rotated.
  - Direct force (as seen in tennis player) pushing humerus head from glenoid cavity.
- **Classification of anterior shoulder dislocation:**
  - **Preglenoid:** Head of humerus lies in front of glenoid
  - **Subcoracoid: MC type;** head lies below the coracoid process
  - **Subclavicular:** Head lies below the clavicle

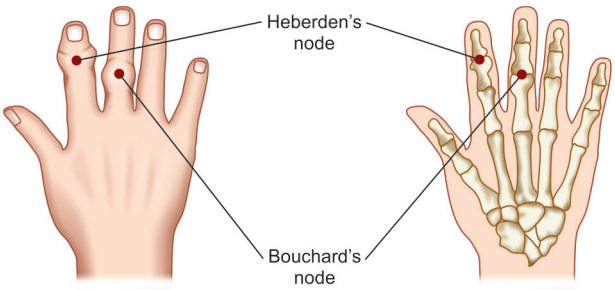
Extra Mile

- **Posterior shoulder dislocation** is associated with epileptiform convulsion or as a consequence of electric shock.
- **Luxatio Erecta -** inferior dislocation. Rare type of shoulder dislocation. Head comes to lie in the subglenoid position.
- **Hill–Sachs lesion**, also **Hill-Sachs fracture**, is a cortical depression in the **posterolateral** head of the humerus bone. It is seen in anterior shoulder dislocation.
- **Reverse Hill Sach's lesion** is due to posterior shoulder dislocation. Micro avulsion is seen on **antero-medial** aspect of humeral head.
- **Bankart lesion** is avulsion of anterior glenoid labrum.

34. Ans. (c) Distal interphalangeal joint

Ref: Colour Atlas of Clinical Pharmacology by N Bellamy, pg. 60

- *Heberden's arthropathy/node* is a form of joint pathology seen in osteoarthritis and involves distal interphalangeal joint.
- Another similar pathological involvement of proximal interphalangeal joint in osteoarthritis is known as *Bouchard's nodes*.



Question 132

Most common joint involved in osteoarthritis? *(FMGE JULY 2024)*

a. Knee
b. Mtp
c. Mcp
d. DIP

Extra Mile

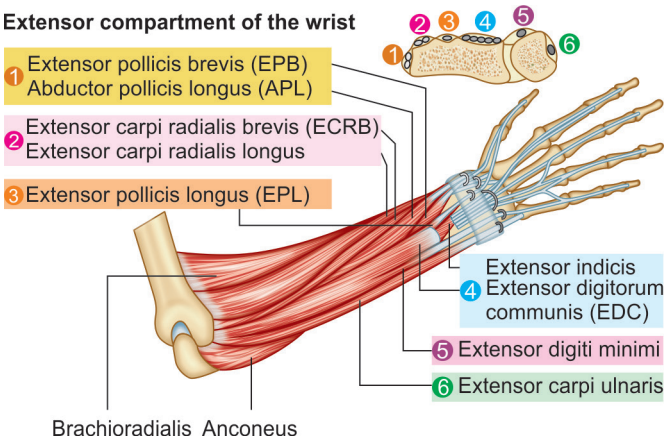
TABLE: Joint involvement in several conditions

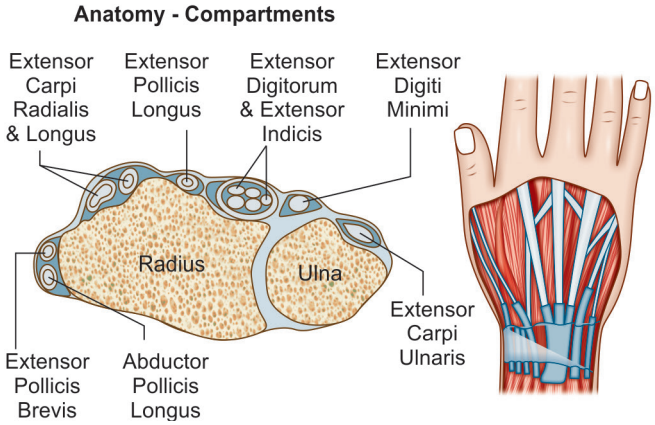
	Osteoarthritis	Rheumatoid arthritis	Psoriatic arthritis
Joint involved	PIP DIP and 1st carpometacarpal joint (1st CMC) Knee	• PIP • MCP • Wrist	• DIP • PIP and any other joints
Joint spared	MCP and wrist	DIP	Any

35. Ans. (b) Extensor carpi radialis brevis and longus

Ref: Hand and Wrist edited by James R. Doyle. pg. 94

- Second compartment of the wrist **contains two muscles namely: Extensor carpi radialis longus and extensor carpi radialis brevis.**
- On the other hand 1st dorsal compartment of hand contains muscles like abductor pollicis longus and extensor pollicis brevis.





Cyclothymia

51. Ans. (c) Depression with dysthymia

Ref: Harrison's 20th ed. pg. 3269

- Prolong/persistent disorder is known as dysthymia. Therefore dysthymia is also known as persistent depressive disorder.
- It consist of a pattern of chronic (at least 2 years), ongoing depressive symptoms that are usually less severe than we seen in major depression.
- Often times the conditions like depression and dysthymia occur together and is difficult to separate.
- This persistence of depression with dysthymia is known as double depression.

52. Ans. (b) Weight loss >75%

Ref: Treatment manual for anorexia nervosa; 2/ed. pg. 277-278

- Anorexia nervosa (AN) is a type of eating disorder marked by an inability to maintain a normal healthy body weight, often dropping below 85% of ideal body weight (IBW).
- Bulimia nervosa (BN) is characterized by recurrent episodes of binge eating in combination with some form of inappropriate compensatory behavior.
- Indian patients chiefly present with refusal to eat, persistent vomiting, marked weight loss, amenorrhea and other somatic symptoms, but do not show over activity or disturbances in body image seen characteristically in anorexia nervosa.
- Nutritional rehabilitation along with some form of re-educative psychotherapy remains the mainstay of management of anorexia nervosa.
- In bulimia nervosa, both fluoxetine and cognitive behavior therapy have been found to be effective.

53. Ans. (a) Adolescence

Ref: Dying, Death and Bereavement; pg. 323

- Copycat suicide also known as Werther effect, is an imitative suicidal behaviour that occurs after exposure to another suicide
- This is more common after exposure to media reports of a celebrity's suicide and exert considerable copycat effect on at-risk individuals.
- It is commonly seen among teenagers and adolescents.

54. Ans. (b) Milnacipran

- Elderly patients are often sensitive to the hypotensive, sedative and anticholinergic effects of TCA, and this patient is at special risk for hypotension because of his carotid artery stenosis. Milnacipran is *least likely* to cause these side effects.
- It is a SNRI

55. Ans. (c) Depression

Ref: Comprehensive Clinical Psychiatry, Theodore, 2nd ed. pg. 221

- Depression is more commonly associated with frontal lobe lesions
- Left frontal lobe lesions are more commonly associated than the right frontal lobe.
- Depression occurs in 30 to 50% of stroke patients within two years of the event.
- Mania is less common and it occurs almost exclusively with right hemisphere lesions. Many of the patients who develop mania have a family history of affective disorders.

Question 133

A patient is complaining of low mood, decrease interest, no hopes of the future, decreased sleep. There was a similar episode in the past 5 years back and patient recovered from it. What is the likely diagnosis? *(FMGE JULY 2024)*

a. Depression/ MDD
b. Recurrent depressive disorder
c. Dysthymia
d. Cyclothymia

57. Ans. (c) Decreased serotonin and norepinephrine

Ref: Harrison 19th ed./2714-2715

- Depression is one of the mood disorders
- It is considered as second most common psychiatric disorder.
- Most commonly seen in middle age females. M:F ratio= 1:2
- ***Neurotransmitters involved are serotonin a NE and DA. All 3 are decreased. (Monoamine Hypothesis)***

Diagnostic Criteria of Depression

Major criteria	Minor criteria
Persistent sadness of mood	Loss of appetite
Loss of pleasure in activities	Sleep disturbance
Easy fatiguability	Decreased libido
	Decreased concentration
	Ideas of guilt, worthlessness, hopelessness
	Suicidal ideas

Depression Category on Basis of Severity

- Mild Depression : 2 major + 2 minor
- Moderate Depression : 2 major + 3 minor
- Severe Depression : 2 major + 4 minor

91. Ans. (c) Exposure and response prevention followed by systemic desensitization

Ref: Harrison, 19th ed. pg. 2712-13

BEHAVIOR THERAPY

- It is the treatment of choice in phobic disorders and several other psychiatric illness. Exposure and response prevention followed by systemic desensitization behavior therapy is the treatment of choice in phobia. It can be of following types:
- Exposure & Response prevention is **1st line of behavior therapy**
- Systemic desensitization: progressive exposure to anxiety evoking stimulus *(2nd line)*
- Flooding (implosion or intensive exposure)
- Relaxation techniques

92. Ans. (b) Early age of onset

Good prognostic factors	Poor prognostic factors
• Acute or abrupt onset • Typical clinical features • Severe depression • Well-adjusted premorbid personality • Good response to treatment	• Co-morbid medical disorder, personality disorder or alcohol dependence • Double depression (acute depressive episode superimposed on chronic depression or dysthymia) • Catastrophic stress or chronic ongoing stress • Unfavourable early environment and *early age of onset* • Marked hypochondriacal features, or mood incongruent psychotic features • Poor drug compliance

93. Ans. (a) Bipolar disorder

Ref: Harrison, 19th ed. pg. 2717

- **DOC for prophylaxis of bipolar disorder- Lithium**
- DOC for acute mania: Benzodiazepines atypical antipsychotic + Lithium
- Lithium can also be used in treatment of neutropenia, Cluster headache and major depression episodes.
- **Therapeutic level of lithium: 0.6–1.5 mEq/L**
- **Toxicity seen after >1.5 mEq/L**
- Most common side effect of lithium: Coarse tremor
- **Side effects of lithium (Mn: LITTH)**
  - Leukocytosis
  - Insipidus (DI)
  - Tremor, teratogenic (MC-Ebstein anomaly)
  - Hypothyroidism
- Lithium is contraindicated in pregnancy. It can cause congenital heart defect- **Ebstein anomaly.**

94. Ans. (c) Phenytoin sodium

Ref: Harrison, 19th ed. pg. 2718, 4665e-2

- Lithium has traditionally been the drug of choice for the treatment of manic episode (acute phase) as well as for prevention of further episodes in bipolar mood disorder. It has also been used in treatment of depression with less success.
- Antipsychotics are an important adjunct in the treatment of mood disorder. The commonly used drugs include risperidone, obnzapine, quetiapine, haloperidol, and aripiprazole.

The other mood stabilizers which are used in the treatment of bipolar mood disorders include

- Sodium valproate
- Carbamazepine and Oxacarbazepine
- Benzodiazepines Lorazepm (IV and orally) and clonazepam
- Lamotrigine
- Topiramate

95. Ans. (c) Borderline

Question 134

A girl child eats her food at one go and after eating too much, induces forceful vomiting. Her BMI is 27. What is the likely diagnosis? *(FMGE JULY 2024)*

a. Anorexia nervosa
b. Binge eating disorder
c. Bulimia nervosa
d. Obesity

96. Ans. (a) Menorrhagia

Ref: Harrison, 17th ed. pg. 471-7

Amenorrhea *(and not menorrhagia)* is seen in 100% patients of anorexia nervosa. It is a mandatory finding diagnostic criterion to be fulfilled for anorexia nervosa.

	Anorexia nervosa	Bulimia nervosa
Feature	Refusal to maintain body weight above a minimal normal	Irresistible craving for food with episodes of over eating in less time (Binge eating)
Method of weight control		Attempts to counter act the effects of over eating by self-induced vomiting: • Purgative abuse, • Periods of starvations • Appetite suppressants

Contd...

global confusion and sympathetic overdrive, which can progress to cardiovascular collapse.

Question 135

A chronic alcoholic consuming alcohol for the last 20 years, had his last drink 3 days back. He presents with altered sensorium, disorientation, tremors, insects crawling on his body. What is the treatment of choice? *(FMGE JULY 2024)*

a. Haloperidol
b. Lorazepam
c. Thiamine
d.

119. Ans. (c) I/V Thiamine + Lorazepam

Ref: Kaplan and Sadock's, Comprehensive Textbook of Psychiatry, 10th ed. pg. 7634

- The hallmark of management for severe symptoms is the administration of benzodiazepines.
- The most commonly used benzodiazepines are intravenous diazepam or intravenous lorazepam for management.
- Due to the risk of a comorbid condition called Wernicke-Korsakoff syndrome, thiamine is also given to the patients.

Question 136

Pt was addmitted had tachycardia, arrhythmia and scratch marks on the skin *(FMGE JULY 2024)*

a. Cocaine
b. Heroin
c. Canabis
d.

120. Ans. (a) Cocaine

Ref: Kaplan and Sadock's, Comprehensive Textbook of Psychiatry, 10th ed. pg. 3252

- Cocaine is an addictive stimulant drug. It can be snorted, injected, or smoked.
- Some other names for cocaine include: coke, blow, powder, crack
- Cocaine has NET inhibitory property, due to which there is increased level of noradrenaline which causes symptoms like tachycardia or arrhythmia. It also produces a tactile hallucination where patient feels like a bug crawling under the skin (cocaine bug), which prompts the patient to scratch the skin.

121. Ans. (b) Alcohol withdrawal delirium

Ref: Neeraj Ahuja 20th ed. pg. 38

Delirium Tremens

- It is a most severe alcohol withdrawal syndrome.
- It is usually seen 2–4 days after complete abstinence of alcohol.

Characterized by

- Disorientation of time, place
- Insomnia
- Visual hallucination, illusion, Tactile hallucination of insects.
- Dehydration with electrolyte imbalance.
- Psychomotor ataxia, agitation
- Marked autonomic disturbance.

Alcoholic Seizures

- Generalized tonic-clonic seizure seen in some alcoholic dependent patient.
- It occurs 12–48 hours after a heavy bout of drinking.

Alcoholic Hallucination

- Occurs during partial or complete abstinence of alcohol and it persist even after alcohol withdrawal syndrome is over.

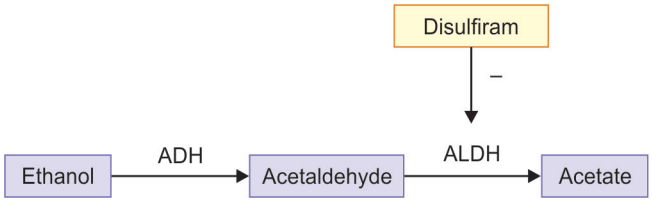
122. Ans. (c) Fomepizole

Ref: Safe and Effective Medication use in Emergency Department, By Victor Cohen; pg. 120

- The primary antidotal treatment of methanol or ethylene glycol involves blocking alcohol dehydrogenase, this enzyme is inhibited by fomepizole or ethanol.

123. Ans. (a) Aversion therapy

Ref: Principles of Addiction Medicine; pg. 843



- Disulfiram acts by inhibiting aldehyde dehydrogenase, which causes accumulation of acetaldehyde.
- This accumulation of acetaldehyde leading to distressing symptoms like hot flushes, pulsatile headache, respiratory difficulty, nausea, vomiting, sweating, orthostatic syncope, chest pain, hypotension, confusion and blurred vision.
- This particular reaction produces aversion from intake of alcohol.

Anticraving medication: Naltrexone, acamprosate, baclofen, fluoxetine, topiramate.

124. Ans. (d) Flunitrazepam

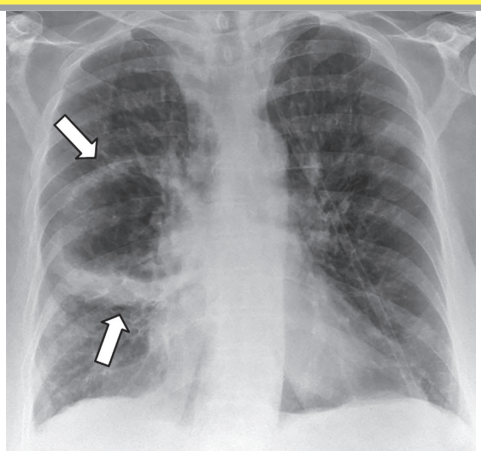
Ref: Harrisons, 19th ed. pg. 469e1; PubMed

- **Flunitrazepam (Rohypnol)** is a tasteless, odorless benzodiazepine derivative primarily used to treat insomnia, but it has significant abuse potential because of its strong hypnotic, anxiolytic, and amnesia-producing

Question 137

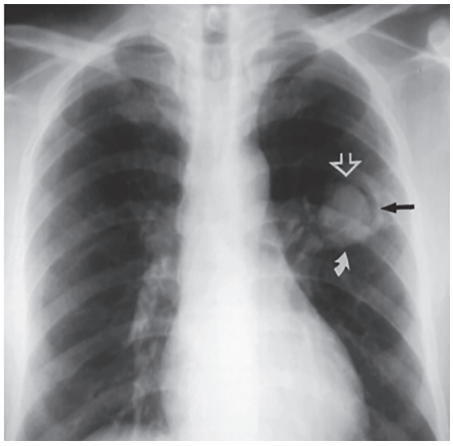
History of TB was given, Make diagnosis based on the given X-ray? *(FMGE JULY 2024)*

a. Bronchogenic carcinoma
b. Aspergilloma
c. Hydatid cyst
d. Lung abscess



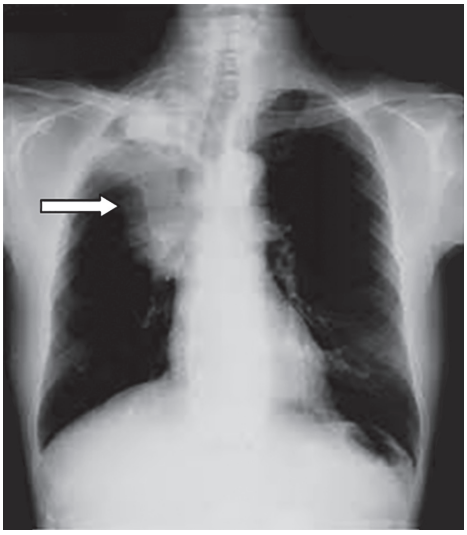
ASPERGILLOMA

- **Aspergillomas** are mass-like fungus balls that are typically composed of *Aspergillus fumigatus* and is a non-invasive form of pulmonary aspergillosis
- **CXR:** Aspergillomas typically appear as rounded or ovoid soft tissue attenuating masses located in a surrounding cavity and outlined by a crescent of air.
- **CT**: Appearances are those of a well formed cavity with a central soft tissue attenuating rounded mass surrounded by an *air crescent sign or a Monad sign.*



177. Ans. (a) Bronchogenic carcinoma with collapse of lung

- The Golden S sign (reverse S sign of Golden) is seen in PA chest radiographs with right upper lobe collapse.
- It is caused by a central mass obstructing the upper lobe bronchus and should raise suspicion of a primary bronchogenic carcinoma.
- The right upper lobe appears dense and shifts medially and upwards with a central mass expanding the hilum. The combination of two changes together form a reverse S shape.



178. Ans. (b) Pulmonary hamartoma

Ref Robbins, 8th ed. pg. 1433

- Lung hamartoma is a lesion seen as rounded focus of radio-opacity called as coin lesion or as popcorn lesion on X-ray.
- It is a benign neoplasm rather than a lung malformation and the finding of chromosomal aberration **6p21 or 12q14,** indicates a **clonal origin.**
- **Note:** Popcorn calcification on mammography: FIBROADENOMA

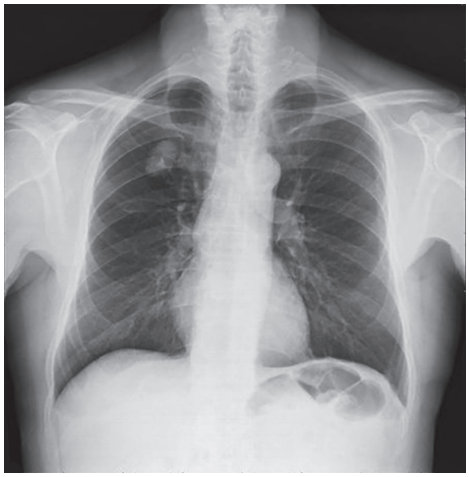
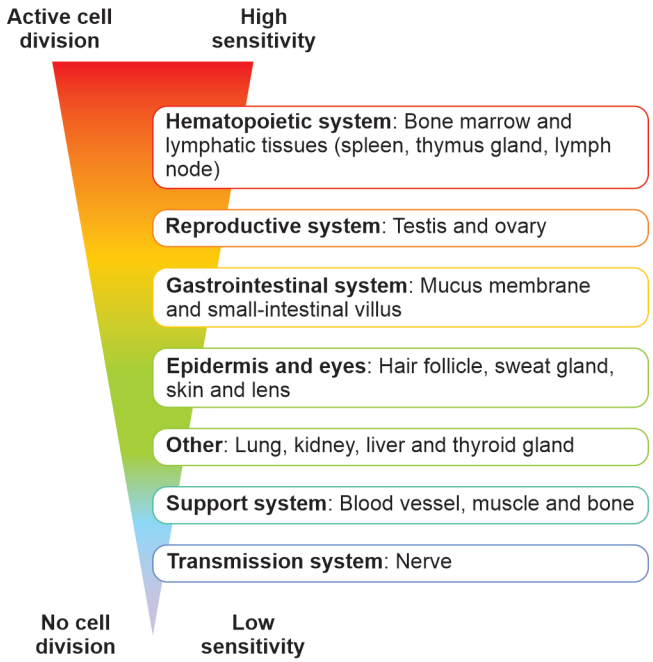


FIGURE: Popcorn calcification in lung-pulmonary hamartoma

Radiosensitivity of organs and tissues

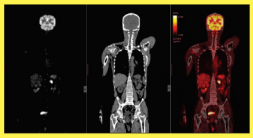
Mechanism of causing effects on human body



Question 138

Following investigation is done for thr patient for a suspected malignancy. Which is the most commonly used agent?

a. FDG
b. Tc-99m
c. Strontium
d. Radium



(FMGE JULY 2024)

17. Ans. (a) F-18

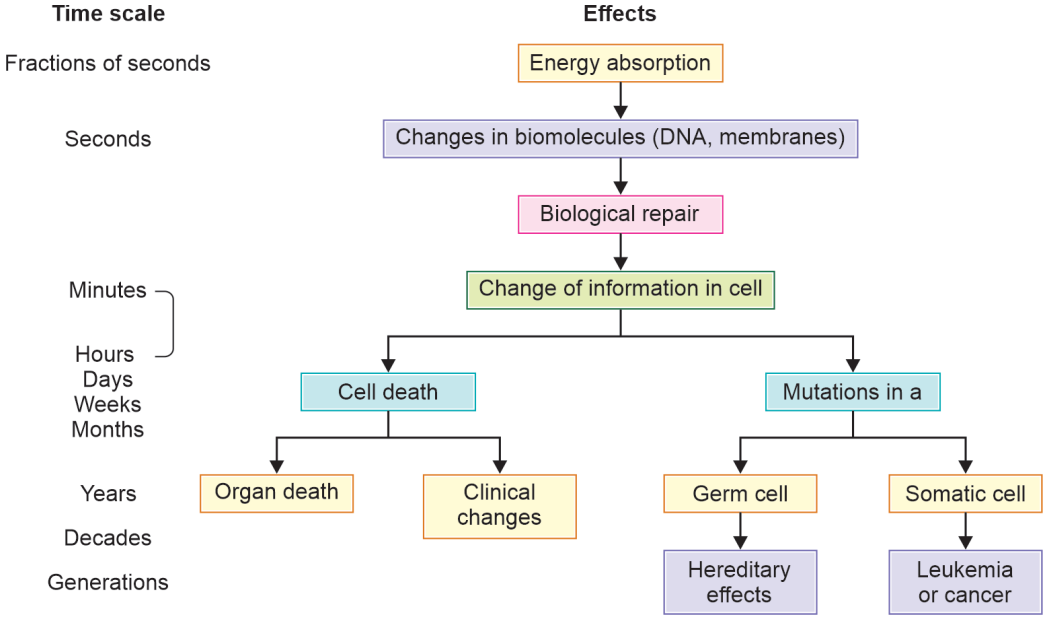
Rf: Harrison 20th ed. pg. 2732

- The radioactive F-18 is a positron emitter and deoxyglucose is the ligand that will be picked up by cancer cells. The gamma camera will pick up the Gamma rays generated in the process.
- Option B, C and D are used in radiotherapy.

18. Ans. (d) Hours to days

Ref: ncbi.nlm.gov.in

Gross biological effect would mean development of cell death which can take few minutes to weeks depending on magnitude of radiation exposure.



Skin erythema	Gy
Irreversible skin damage	20 Gy
Hair loss	Gy
Sterility	Gy
Cataracts	0.5 Gy
Lethality (Whole body)	3–5 Gy
Fetal abnormality	0.1–0.5 Gy

19. Ans. (d) 0.5 mm

Shielding is mainly achieved by wearing protective lead aprons of **0.5 mm** thickness, which have been cited to attenuate over 90%–99% of the radiation dose.

20. Ans. (a) Regular fractionated radiotherapy

- In the case given equal amount of radiation (2 Gy) is delivered at regular intervals for 5 days per week. The objective is to maximize destruction while minimizing damage to healthy tissues.
- Option B delivery is done for max 15 days and will deliver higher dose of radiation in later weeks while in the case given equal amounts are being given. The reason for increasing dose is to neutralize the accelerated tumor growth in later stage of radiotherapy.
- Option C involves treatment given more than once per day of lesser dose 1 Gy
- Option D involves two or more deliveries per day as well on weekends

21. Ans. (c) CT scan

- Functional endoscopic sinus surgery is a minimally invasive technique used to restore sinus ventilation and normal function.
- Fiberoptic telescopes are used for diagnosis and during the procedure, and *computed tomography is used to assess the anatomy and identify diseased areas.*
- The most suitable candidates for this procedure have recurrent acute or chronic infective sinusitis, and an improvement in symptoms of up to 90 percent may be expected following the procedure.

22. Ans. (d) Barium enema

Ref: Radiation dose in X-ray and CT exams; https://www.radiologyinfo.org/en/pdf/safety-xray

TABLE: Radiation exposure in different investigations

Procedure	Mean effective dose (mSv)
• Chest X-ray (PA View)	0.02
• Chest X-ray (PA + Lateral view)	0.1
• Mammogram	0.4
• Abdomen X-ray	0.7
• HSG	0.9 – 1.3
• CT Brain	2.2
• IVP	3
• ERCP	4
• Coronary angiography	7 (2–16)
• Barium enema	8 (2–18)
• CT Colonography	6
• CT Abdomen and Pelvis	10
• Thallium scan	16.9

Contd...

23. Ans. (b) CT and X-ray

- Out of given choices, CT and X-ray work on the same principle.
  - X-rays passed through the body are either absorbed or attenuated (weakened) at different levels
  - The image contains shadow of the dense tissues of body
  - If 3D image required, as in CT, a detector is placed opposite to radiation source. The software takes pictures from different angles and performs reconstruction of image by computer.

Extra Mile

- **Working principle of other radiological procedures:**
  - **Ultrasound:** Uses sound waves (Piezoelectric effect)
  - **MRI:** Uses magnetic fields/radio-frequency waves
  - **Nuclear medicine:** Uses gamma rays
  - **PET scan:** Uses short-lived positron emitting isotopes (each positron gives two gamma rays)

24. Ans. (a) KFT

Ref: Harrison: 19th ed, pg. 1803

The contrast can lead to development of renal shutdown due to contrast nephropathy. Serum creatinine should be checked before any contrast study is performed. Adequate hydration of the patient can prevent such a mishap. Drug of choice for management of contrast nephropathy is N-acetyl Cysteine.

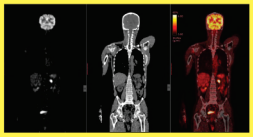
25. Ans. (b) Venography

- Duplex ultrasound is the **initial investigation of choice**

Question 139

Which scan is showed in the following scan?

a. MRI
b. CT Scan
c. PET CT
d.



(FMGE JULY 2024)

26. Ans. (a) PET-CT scan

- The shown image is of PET-CT.

capable of penetrating the human body to several centimeters. Within the body the neutrons release excess energy which can cause tissue damage. Secondary releases of energy may also occur from alpha, beta, and gamma emitters released from the neutrons.

41. Ans. (a) P 32

- **Radioactive phosphorus:** Pure beta emission
  - Used in Bone tumor and polycythemia
- **Cobalt 60**- emits gamma rays
- **Radium-226**- Emits α, β, γ

42. Ans. (d) 20 mSv

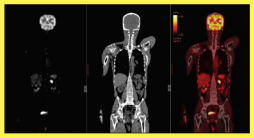
Natural Radiation exposure	2.5 mSv
Yearly dose limit for public	1.0 mSv
Yearly dose limit for occupational workers	**20 mSv**
Dose level at which chromosomal aberrations can be measured	100 mSv
Dose at which nausea, vomiting may start	Approx 1000 mSv (1 Sv)
Dose level for 50% death of exposed population in 60 days	Approx 4,000 mSv (4Sv)

- The US Nuclear Regulatory Commission (NRC) guidelines mandate:

Question 140

Following investigation is done for thr patient for a suspected malignancy. Which is the most commonly used agent?

a. FDG
b. Tc-99m
c. Strontium
d. Radium



(FMGE JULY 2024)

43. Ans. (d) PET scan

- Positron emission tomography (PET) is a nuclear medical imaging modality that produces a three-dimensional image of functional processes in the body.
- The most common indication for a PET scan is to detect *cancer metastasis.*
- The technique operates on the principle of detecting gamma rays emitted indirectly by a positron-emitting radionuclide (tracer).
- Three dimensional imaging is done with the aid of a CT X-ray scan performed on the patient during the same session.
- The biologically active molecule chosen for PET is FDG (*18-Fluoro deoxy glucose*), an analogue of glucose, the concentrations of tracer imaged will indicate tissue metabolic activity by virtue of the regional glucose uptake.
- **Also remember:** Functional magnetic resonance imaging or functional MRI (fMRI) is an imaging procedure that measures brain activity by detecting associated changes in blood flow. This technique relies on the fact that cerebral blood flow and neuronal activation are coupled. It is used for diagnosis of alzeihmer's disease.

44. Ans. (c) MRI-Imaging

Ref: Harrison, 19th ed. pg. 440

- **The most commonly used compounds for contrast enhancement are gadolinium-based** and they improve the visibility of internal body structures in magnetic resonance imaging.
- *MRI contrast agents alter the relaxation times of atoms within body tissues where they are present after oral or intravenous administration.*
- This relaxation emits energy which is detected by the scanner and is mathematically converted into an image.
- *Gadolinium containing MRI* contrast agents are used for enhancement of vessels in MR angiography or for brain tumor diagnosis which is associated with the degradation of the blood-brain barrier.

45. Ans. (a) Pacemaker

Ref: Harrison, 19th ed. pg. 440e-t

Contraindications of MRI

Absolute contraindication	Relative contraindication
• Pacemaker • Metallic foreign body in the eye • Deep brain stimulator • Swan-Ganz catheter • Bullets or gunshot pellets • Cerebral aneurysm clips • Cochlear implant • Magnetic dental implants	• AAA stent • Stapes implant • Implanted drug infusion device • Neuro or bone growth stimulator • Surgical clips, wire sutures, screws or mesh • Ocular prosthesis • Penile prosthesis • Joint replacement or prosthesis • Other implants, in particular mechanical devices

126. Ans. (c) USG

Ref: Bailey, 26th ed. pg. 1100

127. Ans. (c) USG

Ref: Bailey, 26th ed. pg. 109

- In any case of bunt abdominal trauma, first investigation to be performed is ultrasonography.
- In emergency situation, USG technique used is FAST (Focussed Assessment with Sonography for Trauma).
- In FAST, the radiologist, immediately performs the USG abdomen keeping in mind to assess the four major areas to see any collection of fluid due to abdominal organ rupture.
- **Four areas assessed in FAST:** Perihepatic area, Perisplenic area, Pericardial area, Pelvis
- **Updated modality of FAST is eFAST (Extended FAST): Pleural areas are also assessed along with superior mediastinal area.**

128. Ans. (b) CT

THORAX IMAGING

129. Ans. (b) Bronchiectasis

Ref: Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th ed. pg. 136

- Bronchiectasis is defined as irreversible dilatation of a portion of the bronchial tree. The three most important mechanisms that contribute to the pathogenesis of bronchiectasis are infection, airway obstruction and peribronchial fibrosis.
- In the given CXR, the arrows demonstrate mucous plugging of dilated airways.

CXR findings:

Direct Signs

- Parallel line opacities (tram track appearance)
- Tubular opacities (mucous filled bronchi)
- Ring opacities (dilated end-on bronchi)

Indirect Signs

- Lobar atelectasis (secondary to mucous plugging)
- Compensatory overinflation of the less affected lobe/ lung

130. Ans. (a) Pleural effusion

Ref: Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th ed. pg. 43

- Chest radiographs are the most commonly used examination to assess for the presence of pleural effusion. Upright chest radiography is highly sensitive in detecting pleural effusion.
- Most common radiographic sign is pleural meniscus as evident in the CXR.
- The diaphragmatic contour is partially or completely obliterated, depending on the amount of the fluid (silhouette sign).

131. Ans. (a) Pneumothorax

Ref: Grainger and Allison's Diagnostic Radiology: A Textbook of Medical Imaging, 7th ed. pg. 50

Pneumothorax refers to the presence of gas in the pleural space. When this collection of gas is constantly enlarging with resulting compression of mediastinal structures, it can be life-threatening and is known as a tension pneumothorax (if no tension is present, it is a simple pneumothorax).

Features of Pneumothorax on CXR:

- Visible visceral pleural edge is seen as a very thin, sharp white line

Question 141

Make diagnosis based on the given X ray? *(FMGE JULY 2024)*

a. Pneumoperitoneum
b. SBO
c. Esophageal perforation
d.

132. Ans. (a) Perforation peritonitis

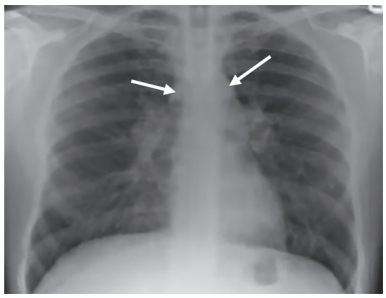
Ref: SRB Manual of Surgery, 2019 ed. pg. 822

- The X-ray abdomen taken in erect position shows gas under diaphragm. This is seen in pneumoperitoneum due to viscus perforation. Most of the time this is due to Peptic ulcer disease.
- Option B has deep sulcus sign and absent vascular markings. Option C and D will have blunting of CP angle.

133. Ans. (c) Metastasis

Ref: Crofton's Respiratory Diseases pg. 1145

- The CXR shows multiple rounded opacities in the bilateral lung fields which is classical for canon ball metastasis. This is seen with choriocarcinoma, RCC and breast Cancer.
- Option B will produce a cavity or consolidation in upper lobe on one side
- Option C will produce a solitary mass lesion. Option D will produce a solitary popcorn calcification.



147. Ans. (c) Foreign body aspiration

- Due to sudden nature of respiratory difficulty pneumonia is ruled out. Asthma is ruled out on basis of CXR findings as it only shows hyperinflation.
- Foreign body aspiration is much more common in children as compared to pneumothorax.
- Pneumothorax does not show diffuse opacity but shows hypertranslucent lungs with absent vascular markings.
- Child with sudden onset dyspnea and decreased breath sounds is sufficient for diagnosis of FB in airway. CXR findings take some time to develop.

148. Ans. (a) Hydropneumothorax

Question 142

Make diagnosis based on the X-ray given below. *(FMGE JULY 2024)*

a. Lung cancer
b. Miliary TB
c. ARDS
d. Aspergilloma

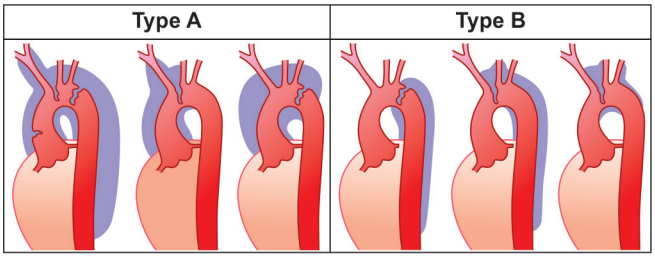
149. Ans. (d) Military TB

CXR shows multiple millet like seeding of TB bacilli in the lung in an AIDS Positive patient with symptoms of LRTI. The leading opportunistic infection in AIDS Positive patient is TB. Low immunity favors dissemination.

150. Ans. (a) Aortic dissection

Ref: Harrison 20th ed. pg. 1921

The given image is of a CT chest showing intimal flap of aortic dissection and involves both ascending and descending aorta.



151. Ans. (a) MUGA

Ref: Harrison 20th ed. pg. 675

MUGA or Multiple Uptake Gated Acquisition Angiography and is used to asses LV function and Volume. Choices B, C and D are used for angiographically significant Coronary artery disease.

152. Ans. (a) Diaphragmatic hernia

- The shown image is suggestive of diaphragmatic hernia.
- Intestinal loop in thoracic cavity and absence of bowel loops in abdomen is highly suggestive of diaphragmatic hernia.

153. Ans. (c) Trachea

- The structure in CXR lateral view is trachea. Refer to the image below

Question 144

Make diagnosis based on the given X ray? *(FMGE JULY 2024)*

a. Pneumoperitoneum
b. SBO
c. Esophageal perforation
d.

155. Ans. (b) Pneumoperitoneum

- **IOC for pneumoperitoneum:** Chest X-ray PA view in erect position (including diaphragm)

RADIOLOGICAL SIGNS OF PNEUMOPERITONEUM

- **Gas under diaphragm sign:** Accumulation of gas under right side hemidiaphragm
- **Mustache sign**/Cupola sign/Saddle bag sign
- **Rigler sign:** Air outlining both internal and external intestinal wall
- **Urachus sign:** Air outlining middle umbilical ligament
- **Inverted V sign:** Air outlining both umbilical ligaments
- **Falciform ligament sign:** Air surrounding falciform ligament (becomes prominent).

CBSPD
Dedicated to Education

Questions asked line to line from **FMGE Solutions** book in **FMG July 2024** with exact references from the book

144 MCQs came directly from **FMGE SOLUTIONS**

Authored by
Dr Deepak Marwah | Dr Siraj Ahmad

Scan to Get the Questions & Explanations