

NEET PG 2024 (Shift 1)

Question Paper with Solutions

Detailed step-by-step solutions

General Instructions

- (i) This booklet contains 142 questions, each provided with a complete, step-by-step solution.
- (ii) It comprises 142 single-correct multiple-choice questions.
- (iii) Attempt each question on your own before reviewing the given solution.

1.

Which area is fractured in the given X-ray?



- (A) Tibial tuberosity
- (B) Medial epicondyle of tibia
- (C) Gerdy's tubercle

Correct Answer: (A) Tibial tuberosity

Solution

Upon reviewing the X-ray in question, it is necessary to identify the fractured area. The focus will be on the anatomical landmarks present in the options.

Options Analysis:

- **Tibial tuberosity:** This is a prominent triangular eminence of the anterior proximal tibia, which serves as the attachment for the patellar ligament. It is

commonly associated with injuries related to osgood-schlatter disease or trauma.

- **Medial epicondyle of tibia:** Located on the distal end of the tibia, this area is not typically as susceptible to fractures as other features of the knee.
- **Gerdy's tubercle:** Located laterally on the proximal tibia, Gerdy's tubercle is where the iliotibial band inserts, but fractures in this region are rare.

Conclusion: Based on the anatomical details and common fracture sites, the area identified as fractured in the given X-ray is the **tibial tuberosity**. This region is prone to fractures due to its prominence and role in tendon attachment.

Quick Tip: Fractures of the tibial tuberosity are often seen in active adolescents and can result from trauma or repetitive stress.

2.

Which nerve will be commonly involved if the injury occurs at the marked levels?



- (A) L4
- (B) L5
- (C) L2
- (D) L3

Correct Answer: (B) L5

Solution:

In the context of the question regarding which nerve is commonly involved in an injury occurs at certain spinal levels, it is important to understand the relationship between spinal levels and the nerves they affect.

The human spinal cord is divided into segments that correspond to vertebrae. Each segment is associated with a pair of spinal nerves, which are named after the vertebral level they exit from. The spinal nerves control sensorimotor functions by innervating different parts of the body, including muscles and skin.

For the specific spinal segment in question:

- **L2** - Innervates muscles that flex the hip.
- **L3** - Innervates muscles that control the knee extension.
- **L4** - Affects the quadriceps and is involved in knee-jerk reflex.
- **L5** - Affects muscles responsible for dorsiflexion, a movement that raises the foot upwards.

In clinical practice, L5 is commonly associated with injuries due to its position and the frequency with which it bears weight and bends. An injury at L5 can affect the extensor muscles which are crucial for foot movements.

Therefore, the nerve commonly affected by an injury at the marked levels is:

- **Correct Answer: L5**

Quick Tip: L5 nerve root lesions are often associated with foot drop and weakness in the dorsiflexion of the foot, and they are common in lumbar spine injuries.

3.

What is the most likely diagnosis for the lesion shown here?



(A)

Sunburst appearance

(B)

Onion-skin appearance

(C)

Codman's triangle

(D)

Ground glass appearance

Correct Answer: (A)

Sunburst appearance

Solution:

To determine the most likely diagnosis for a lesion, a systematic approach should be taken by considering the characteristics of the lesion, such as its color, size, shape, texture, location, and any associated symptoms. As the question does not provide a specific description or image of the lesion, let's outline a general approach to diagnosing skin lesions:

1. **Lesion Characteristics:** Evaluate whether the lesion is macular (flat), papular (raised), nodular (solid), or vesicular (fluid-filled), and check for additional features like ulceration or scaling.

2. **Color Analysis:** Determine if the lesion is hyperpigmented, hypopigmented, erythematous (red), or has other distinct colorations which are often indicative of specific conditions.
3. **Pattern Recognition:** Identifying common patterns such as annular (ring-shaped), linear, or grouped lesions can aid in pinpointing common dermatological diagnoses like fungal infections or psoriasis.
4. **Location Considerations:** Where on the body the lesion is located. Some conditions have a predilection for specific body parts, like psoriasis on extensor surfaces or seborrheic dermatitis affecting the scalp and face.
5. **Patient History:** Consider any recent exposure to allergens, infections, or trauma. Medical history such as immune status or family history can also provide important diagnostic clues.
6. **Symptom Analysis:** Determine if the lesion is symptomatic (itching, pain) or asymptomatic; some lesions like basal cell carcinoma are notorious for being painless, while others like dermatitis are itchy.

Without specific options or an image, a definitive diagnosis cannot be made. However, by assimilating these steps, similar phenomena in different cases can usually be categorized quickly and accurately.

Quick Tip: The sunburst pattern is often seen in aggressive bone tumors like osteosarcoma and is a key diagnostic feature on radiographs.

4. A patient from a railway station is arrested by police and shows symptoms like dilated pupils, sweating, hot skin, and staggering gait. He is suspected to have intoxication from:

- (A) Dhatura
- (B) Cocaine
- (C) Alcohol
- (D) Morphine

Correct Answer: (A) Dhatura

Solution:

The symptoms described—including dilated pupils, sweating, hot skin, and staggering gait—are indicative of anticholinergic poisoning. These symptoms are associated with intoxication caused by substances that block the neurotransmitter acetylcholine in the central and peripheral nervous system.

Among the given options:

- **Dhatura:** Contains tropane alkaloids like atropine, scopolamine, and hyoscyamine, which have strong anticholinergic effects. Symptoms of intoxication include dilated pupils, dry skin, flushing (hot skin), confusion, hallucinations, and tachycardia. The symptoms match the description given.
- **Cocaine:** Primarily causes symptoms related to sympathetic nervous system stimulation such as dilated pupils and elevated heart rate, but typically does not cause all of the symptoms listed simultaneously.
- **Alcohol:** Can cause impaired coordination and gait (staggering gait) but usually does not cause pupil dilation or hot, dry skin; in fact, it often results in pupil constriction.
- **Morphine:** An opiate which often causes pinpoint pupils, respiratory depression, and reduced consciousness, none of which align with the symptoms described.

Therefore, the correct answer is **Dhatura**, as it aligns with all the symptoms presented, consistent with its anticholinergic properties.

Quick Tip: Dhatura poisoning is characterized by anticholinergic symptoms, including dilated pupils, dry skin, and altered mental status.

5. II. M at 28 weeks for congenital anomalies, whose presence is not required?

- (A) Obstetrician
- (B) Lawyer
- (C) Pediatrician
- (D) Sonologist

Correct Answer: (B) Lawyer

Solution:

In the context of Medical Termination of Pregnancy (MTP) at 28 weeks for congenital anomalies, a multidisciplinary team is often involved to ensure a comprehensive assessment and ethical decision-making. The presence of certain professionals is crucial: an Obstetrician to manage the medical procedure, a Pediatrician to assess the fetal condition, and a Sonologist for detailed ultrasound scanning. However, a Lawyer is not required in the medical decision-making process for MTP, as legal considerations are generally managed by following established medical and legal guidelines.

Quick Tip: MTP at 28 weeks due to congenital anomalies requires the involvement of medical professionals like obstetricians, pediatricians, and sonologists, but not necessarily a lawyer.

6. A child was born after the death of his father, and some of them claimed that the child is not from his biological father. DNA fingerprinting was done to identify the father, and the deceased father was found to be the biological father. This child is called as:

- (A) Posthumous child
- (B) Compositional child
- (C) Illegitimate child

Correct Answer: (A) Posthumous child

Solution:

A **posthumous child** is a child born after the death of their biological father. In this scenario, DNA fingerprinting was employed to confirm the biological paternity of the child, establishing the deceased father as the true parent. This kind of determination is critical in affirming familial relationships and ensuring that the child is accurately acknowledged within their biological lineage. The term specifically used for such a child is "Posthumous child."

Quick Tip: Posthumous children are conceived after the father's death and are legally considered as his children if paternity can be confirmed.

7. Which one is correct about the sequence of rigor mortis?

- (A) Centre to periphery
- (B) Head to foot
- (C) Foot to head
- (D) Simultaneously

Correct Answer: (B) Head to foot

Solution:

Rigor mortis is the post-mortem stiffening of the body's muscles due to biochemical changes in muscle tissues, occurring after death. The sequence of rigor mortis describes the order in which the stiffness develops and progresses within the body.

The correct sequence of rigor mortis is from **head to foot**, meaning the stiffness typically begins in the smaller muscles of the face and neck and then progresses downwards towards the larger muscles of the trunk, limbs, and finally the feet.

This progression is primarily due to the involuntary nature of smaller muscle groups succumbing first, akin to how they would respond to fatigue or biochemical changes more rapidly during life.

Quick Tip: Rigor mortis begins in the small muscles of the face and progresses down the body, ending in the lower extremities.

8. An 18-year-old male accused of rape claims he is 16 years old. Which joint X-ray should be done?

- (A) Elbow and ankle
- (B) Knee and wrist
- (C) Shoulder and head
- (D) Hip & knee

Correct Answer: (B) Knee and wrist

Solution:

To determine the age of an individual by analyzing bone growth, specific X-rays are conducted to examine the growth plates (epiphyseal plates) in various joints. For adolescents and young adults, these growth plates can help discern approximate age, as they close at different stages of development. In this scenario, an 18-year-old male is claiming to be 16 years old. To confirm or refute this claim, examining the knee and wrist joints is suggested. These joints contain growth plates that offer crucial age-related information:

- **Knee:** The distal femur and proximal tibia epiphyseal plates typically close around the age of 17-19 in males, which makes it an ideal choice to verify if someone is older than 16.
- **Wrist:** The epiphyseal plates in the wrist, particularly the radius, close around the age of 18-19. Examining these can provide evidence of whether the individual is closer to 18 or still around 16.

By using X-rays of these joints, it is possible to estimate whether the individual's bone age aligns more closely with 16 or 18, thus potentially confirming their actual age.

Quick Tip: Knee and wrist X-rays are standard for assessing skeletal maturity and estimating age, as these joints exhibit predictable patterns of growth plate closure.

9.

What is the management of the endoscopic finding given in the image?



- (A) Stenting
- (B) Balloon dilatation
- (C) Fulguration
- (D) Internal urethrotomy

Correct Answer: (C) Fulguration.

Solution:

The management of the endoscopic finding depicted involves selecting the most appropriate intervention method. Based on the provided options, the correct management procedure is **Fulguration**. Fulguration is typically used to destroy abnormal tissues or lesions discovered during endoscopy, often through the use of electrocoagulation. This approach is selected over other methods like stenting, balloon dilatation, or internal urethrotomy which serve different purposes such as alleviating obstructions or strictures, and do not fit the context of the tissue or lesion destruction shown in the image.

Quick Tip: Fulguration is a useful treatment option for superficial lesions, where heat is applied to destroy the abnormal tissue.

10.

Identify the image given in UGIE (Upper Gastrointestinal Endoscopy)



- (A) Barrett's esophagus
- (B) Esophageal varices
- (C) Gastric erosion
- (D)

Correct Answer: (B) Esophageal varices

Solution:

To identify the image in an Upper Gastrointestinal Endoscopy (UGIE), we need to understand the characteristics of each condition listed as options:

- **Barrett's esophagus:** This condition involves a change in the lining of the esophagus to a type that resembles the lining of the intestine. During endoscopy, it appears as a salmon-pink color extending in tongues from the gastroesophageal junction.
- **Esophageal varices:** These are swollen veins, typically in the lower part of the esophagus or upper part of the stomach due to portal hypertension. On endoscopy, they appear as dilated, bluish, serpentine veins.
- **Gastric erosion:** These are shallow lesions on the stomach lining, often looking like a superficial ulceration or small defects in the mucosa.

Given that the correct answer is **Esophageal varices**, the image likely shows characteristics of dilated, bluish veins in the esophagus.

Quick Tip: Esophageal varices are a common finding in patients with liver cirrhosis and portal hypertension, and they require careful management to prevent life-threatening bleeding.

11.

A 12-year-old child presented with sudden severe onset of scrotal pain after a history of trauma 6 hours before. Intraoperative image is given. What is the likely diagnosis?



- (A) Torsion testis with gangrene
- (B) Testicular hematoma
- (C) Torsion testis
- (D) Gangrene of testis

Correct Answer: (A) Torsion testis with gangrene

Solution:

The clinical presentation of sudden severe scrotal pain after trauma, along with the time frame of 6 hours, suggests a serious underlying condition. The options provided refer to different testicular pathologies, but the specific details point to one situation. In cases of scrotal pain with a history of trauma, the possible diagnoses usually include torsion of the testis or testicular hematoma among others. However, considering the time elapsed and the description, the most likely diagnosis is **torsion of the testis coupled with gangrene**.

Torsion of the testis occurs when the spermatic cord twists, cutting off the blood supply to the testis. If left untreated, this can progress to gangrene due to the

prolonged ischemia, typically within 6 to 12 hours.

Given that the problem states the child presented with pain 6 hours after trauma, it aligns with the window for torsion leading to ischemia and potential gangrene development. Therefore, the correct diagnosis based on the symptoms and the critical time interval mentioned is **torsion testis with gangrene**.

Quick Tip: Testicular torsion is a surgical emergency, and prompt intervention within 6 hours is crucial to save the testis from gangrene.

12. What is the negative pressure in VAC dressing?

- (A) 60-90 mmHg
- (B) 90-100 mmHg
- (C) 120-130 mmHg
- (D) 130-150 mmHg

Correct Answer: (C) 120-130 mm Hg

Solution:

The negative pressure in a Vacuum-Assisted Closure (VAC) dressing, also known as negative pressure wound therapy (NPWT), refers to the suction pressure applied to promote wound healing through increased blood flow and removal of exudates. The standard negative pressure range used in this therapy is typically 120-130 mm Hg. This suction helps to draw the edges of the wound together and is effective in promoting healing by encouraging granulation tissue formation.

Given the options, the range of **120-130 mmHg** is correct for the negative pressure applied in VAC dressing.

Quick Tip: The optimal range for negative pressure in VAC dressing is 120-130 mmHg to effectively promote wound healing and tissue regeneration.

13. Identify the structure marked in the intraoperative image of congenital inguinal hernia:

- (A) Femoral vein
- (B) Obturator vein
- (C) Testicular vein
- (D) Inferior epigastric vein

Correct Answer: (C) Testicular vein

Solution:

In the intraoperative image of a congenital inguinal hernia, identifying the correct structure requires understanding the anatomy involved. Here's a brief explanation of each option, guiding us to the correct answer:

- 1. Femoral Vein:** The femoral vein runs through the femoral sheath alongside the femoral artery and nerve. It is located beneath the inguinal ligament and lateral to the femoral canal, making it an unlikely candidate in this context.
- 2. Obturator Vein:** Situated within the pelvis, the obturator vein drains into the internal iliac vein. It is not typically involved in the anatomy of a congenital inguinal hernia.
- 3. Testicular Vein:** Arising from the pampiniform plexus, the testicular vein is located in the spermatic cord, which is found within the inguinal canal involved in an inguinal hernia. This makes it the most relevant structure in this context.
- 4. Inferior Epigastric Vein:** This vein travels superiorly from the external iliac vein and is associated with the anterior abdominal wall, rather than the structures commonly seen in a congenital inguinal hernia repair.

The structure visible in the image associated with the inguinal canal and spermatic cord is therefore identified as the **Testicular Vein**.

Quick Tip: The testicular vein should be identified and preserved during the repair of a congenital inguinal hernia to prevent damage to the venous drainage of the testes.

14. How does a skin graft derive its nutrition on day 3?

- (A) Plasma imbibition
- (B) Inosculation
- (C) Neovascularization
- (D) None

Correct Answer: (B) Inosculation

Solution:

On day 3 after a skin graft, the primary source of nutrition is derived through a process known as **inosculation**. This is a critical phase in skin grafting, which involves the connection of capillaries from the graft with the recipient site's capillaries. Here's a breakdown of the steps involved:

- **Initial Days (Days 1-2): Plasma Imbibition** - Initially, the graft survives by absorbing nutrients directly from the wound bed through a process called plasma imbibition. This helps the graft remain hydrated and partially nourished.
- **Subsequent Days (Around Day 3): Inosculation** - By the third day, a new phase begins where the capillaries from the recipient site and the graft start to physically connect. This is the direct inosculation process, effectively allowing the graft to derive its nutrient supply directly from the host's blood circulation.
- **Later Stage: Neovascularization** - Eventually, new blood vessels form in a process known as neovascularization, ensuring long-term survival and integration of the graft.

Thus, **inosculation** is the correct mechanism for nutrition on day 3.

Quick tip: Inosculation is critical in the early stages after skin grafting, as it establishes blood supply between the graft and the recipient tissue.

15.

Identify the ulcer:



- (A) Arterial
- (B) Venous
- (C) Trophic
- (D) Diabetic foot ulcer

Correct Answer: (B) Venous

Solution:

Identifying Ulcers:

Ulcers are wounds that can be classified based on their etiology and characteristics. To identify the type of ulcer, examine the location, appearance, and patient history.

- **Arterial Ulcer:** Often found on toes, heels, or pressure points. They're painful, have a well-defined edge, and a deep wound bed. Causes include poor blood supply due to arterial disease.
- **Venous Ulcer:** Typically located on the lower leg, especially around the ankle. They present with an irregular border, a shallow wound, and may be accompanied by varicose veins. Swelling, aching, and skin changes are common due to venous insufficiency.
- **Trophic Ulcer:** These arise from nerve damage causing loss of sensation, usually on weight-bearing areas. They are painless due to neuropathy and have a punched-out appearance.

- **Diabetic Foot Ulcer:** Found on foot pressure points in individuals with diabetes. They result from neuropathy and poor circulation, often painless, with a high risk of infection.

Given the correct answer is "Venous", identifying it involves looking for *swelling, irregular borders, and location on the lower leg near ankles*, typical signs resulting from venous insufficiency.

Quick Tip: Venous ulcers are often seen in the lower legs and are caused by poor venous circulation, leading to stagnation and skin breakdown.

16. A 30-year-old female presented with swelling in the neck. What is the next step in evaluation?

- (A) I131
- (B) FNAC
- (C) TSI & T4
- (D) FSH

Correct Answer: (C) TSI & T4

Solution:

When a 30-year-old female presents with neck swelling, it can be indicative of thyroid gland involvement, such as goiter or thyroid dysfunction. To properly assess and evaluate this condition, laboratory tests can help determine the underlying cause.

The given options for the next step in evaluation are:

- I131
- FNAC
- TSI & T4
- FSH

Let's analyze each:

1. **I₁₃₁**: This is a radioactive iodine uptake test primarily used to assess thyroid function and diagnose hyperthyroidism. However, it is not the first-line test for evaluating neck swelling.
2. **FNAC (Fine Needle Aspiration Cytology)**: This procedure helps in obtaining tissue samples for cytological examination and is usually recommended when there is suspicion of a thyroid nodule or malignancy.
3. **TSI & T4**: These are blood tests measuring Thyroid Stimulating Immunoglobulin (TSI) and thyroxine (T4), respectively. TSI is particularly useful in evaluating autoimmune thyroid conditions (e.g., Graves' disease), while T4 levels indicate overall thyroid function. It helps in assessing thyroid gland activity in cases of swelling potentially due to hyperthyroidism.
4. **FSH (Follicle Stimulating Hormone)**: This is related to reproductive health and is not relevant to assessing thyroid-related neck swelling.

Considering the options, the most pertinent step for evaluating neck swelling of likely thyroid origin is to perform blood tests to check for thyroid function and autoimmunity. Therefore, the next step should be measuring **TSI & T4** levels to gain insight into the thyroid's activity and possible autoimmune involvement.

Quick Tip: Measuring thyroid hormones (TSH, T3, T4) is crucial for diagnosing thyroid disorders in patients with neck swelling.

17. A 5-year-old girl was washing her doll with shampoo containing a chemical Rotenone. Her mother notices her in an unconscious state. Which of the following complex is inhibited by the above-mentioned chemical?

- (A) NADH Dehydrogenase
- (B) Succinate DH
- (C) Cytochrome C
- (D) Cytochrome oxidase

Correct Answer: (A) NADH Dehydrogenase

Solution:

In the context of mitochondrial electron transport chain, Rotenone is a well-known inhibitor. To understand its impact, let's analyze the specific role of each complex in the electron transport chain:

1. **NADH Dehydrogenase (Complex I):** This complex is the first entry point for electrons from NADH. Rotenone inhibits this complex, preventing NADH from donating electrons.
2. **Succinate DH (Complex II):** This complex oxidizes succinate to fumarate, facilitating electron transfer from FADH_2 .
3. **Cytochrome C:** This is a small protein that transfers electrons between Complexes III and IV.
4. **Cytochrome oxidase (Complex IV):** This complex transfers electrons to oxygen, the final electron acceptor, reducing it to water.

Given that Rotenone specifically inhibits the transfer of electrons from NADH to the ubiquinone in Complex I, the inhibited complex is **NADH Dehydrogenase**.

Quick Tip: Rotenone inhibits NADH dehydrogenase, disrupting ATP production and leading to cellular dysfunction and toxicity.

18.

Which of the following is true regarding the image provided?



- (A) EMLA contains ropivacaine and lidocaine.
- (B) EMLA can lead to hemoglobinemia.
- (C) EMLA contains 5 percent lignocaine.
- (D) EMLA acts within 15 minutes.

Correct Answer: (B) EMLA can lead to hemoglobinemia.

Solution:

EMLA (Eutectic Mixture of Local Anesthetics) Overview:

EMLA is a topical anesthetic composed primarily of lidocaine and prilocaine. It's designed to numb the skin before certain medical procedures.

Analysis of Options:

- **EMLA contains ropivacaine and lidocaine:** This is incorrect; EMLA contains lidocaine and prilocaine, not ropivacaine.
- **EMLA can lead to hemoglobinemia:** This is correct. EMLA, due to the prilocaine component, can lead to methemoglobinemia, a condition where hemoglobin is modified, potentially impairing oxygen transportation.
- **EMLA contains 5 percent lignocaine:** This is incorrect; EMLA contains a combination of lidocaine and prilocaine in equal proportions, typically not 5% lidocaine alone.
- **EMLA acts within 15 minutes:** This is incorrect; EMLA typically requires longer to take effect, usually around 30-60 minutes for full efficacy.

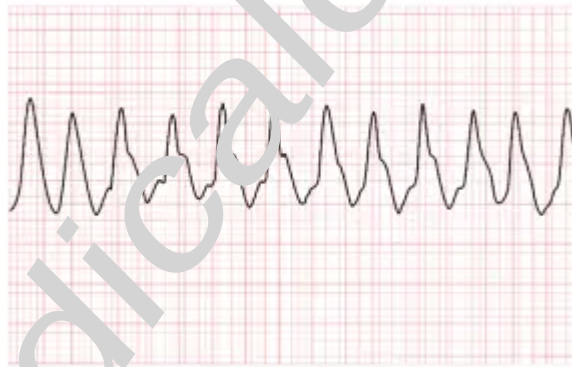
Conclusion:

The correct statement regarding EMLA is that it can lead to hemoglobinemia due to the prilocaine component causing methemoglobinemia.

Quick Tip: Always check the ingredients and possible side effects of any topical anesthetic. For EMLA, be aware of the risk of methemoglobinemia, especially with prolonged use.

19.

A patient presents with no pulse, and the ECG shows the following rhythm. What is the next appropriate step?



- (A) Defibrillate, check pulse and then perform CPR
- (B) Cardioversion
- (C) Defibrillate, perform CPR, and then check the pulse
- (D) Administer epinephrine

Correct Answer: (C) Defibrillate, perform CPR, and then check the pulse

Solution:

In a case where a patient presents with no pulse, and the ECG shows a rhythm that indicates a shockable cardiac arrest, the immediate goal is to restore circulation. This can often be achieved through defibrillation. Here's the step-by-step solution:

1. **Recognize the Situation:** The absence of a pulse combined with a shockable rhythm on the ECG (such as ventricular fibrillation or pulseless ventricular tachycardia) indicates the need for immediate intervention.
2. **Immediate Action:** *Defibrillation* should be performed as soon as possible. This is critical in the case of shockable rhythms to restore a normal heart rhythm.
3. **Perform CPR:** After delivering a shock, immediately start *Cardiopulmonary Resuscitation (CPR)*. Continue CPR for two minutes before reassessing the patient.
4. **Check the Pulse:** After two minutes of CPR, pause to check the patient's pulse and rhythm.

The answer highlighted reflects these crucial steps: "Defibrillate, perform CPR, and then check the pulse."

Quick Tip: In the case of ventricular fibrillation, defibrillation followed by CPR is the most effective initial management to restore circulation and save the patient's life.

20.

Identify the arrow-marked nerve.



- (A) Medial pectoral nerve
- (B) Lateral pectoral nerve
- (C) Long thoracic nerve
- (D) Thoracodorsal nerve

Correct Answer: (A) Medial pectoral nerve

Solution:

The task is to identify the nerve indicated by an arrow in an image, given several choices. We need to analyze and determine which nerve it is based on available options and anatomical knowledge.

The options provided are:

1. Medial pectoral nerve
2. Lateral pectoral nerve
3. Long thoracic nerve
4. Thoracodorsal nerve

To identify the correct nerve, let's consider the anatomical features and typical locations of each nerve:

- **Medial Pectoral Nerve:** Usually innervates the pectoralis minor and major muscles. It passes through or near the lateral thoracic wall.
- **Lateral Pectoral Nerve:** Primarily innervates the pectoralis major. It often communicates with the medial pectoral nerve.
- **Long Thoracic Nerve:** Innervates the serratus anterior muscle, and is located on the lateral thoracic wall, running along or near the rib cage.
- **Thoracodorsal Nerve:** Innervates the latissimus dorsi muscle. Typically found running in the axillary region.

The correct nerve, as indicated by the provided options, is the **Medial Pectoral Nerve**. This assessment is based on the typical anatomical pathway and innervation characteristics of the listed nerves relevant to the context.

Quick Tip: In neuroanatomy, it is important to familiarize yourself with the origins and functions of the various peripheral nerves, especially their anatomical landmarks.

21. Behind the medial malleolus and in front of Achilles, which artery is present?

- (A) Posterior tibial artery
- (B) Peroneal artery
- (C) Anterior tibial artery
- (D) Dorsalis pedis artery

Correct Answer: (A) Posterior tibial artery

Solution:

The question requires identifying an artery located behind the medial malleolus and in front of the Achilles tendon.

This specific anatomical positioning is associated with the **posterior tibial artery**.

Let's break down the anatomical landmarks:

- **Medial malleolus:** This is the bony prominence on the inner side of the ankle, formed by the lower end of the tibia.
- **Achilles tendon:** A tendon located at the back of the ankle connecting the calf muscles to the heel bone.

The space between these structures is part of the tarsal tunnel. This tunnel contains structures passing into the foot, including:

- Tibialis posterior tendon
- Flexor digitorum longus tendon
- Posterior tibial artery
- Tibial nerve
- Flexor hallucis longus tendon

Of these, the **posterior tibial artery** is the vessel running directly in this region.

Thus, the correct answer is:

Posterior tibial artery

Quick Tip: When studying the arterial system of the lower limb, it is important to remember the locations and functions of the major arteries like the posterior tibial and dorsalis pedis.

22. The covering of an omphalocele is derived from which layer?

- (A) Amnion
- (B) Chorion
- (C) Mesoderm
- (D) Endoderm

Correct Answer: (A) Amnion

Solution:

An omphalocele is a congenital defect in which the abdominal organs protrude outside of the body through the umbilical opening. The key characteristic of an omphalocele is that these organs are covered by a protective layer. The question at hand is regarding the origin of this covering layer. The options provided are:

- Amnion
- Chorion
- Mesoderm
- Endoderm

The correct answer is that the covering of an omphalocele is derived from the **amnion**.

Explanation: During fetal development, the amnion is one of the extra-embryonic membranes that envelops the developing fetus. Specifically, in the case of an omphalocele, the amniotic membrane provides a protective sac covering the herniated organs outside of the abdominal cavity. Unlike other potential coverings like the chorion (which forms the outermost membrane and contributes to the placenta), the mesoderm (which is a middle layer in embryonic development), or the endoderm (which forms the lining of the gut and associated structures), it is the amnion that directly encloses and provides a barrier for the exposed organs in an omphalocele.

Quick Tip: When studying congenital abnormalities, remember that the amnion is

involved in the protection and development of structures in the abdominal area.

23. A 13-year-old boy presents with jaundice, fatigue, muscle stiffness, tremors, behavioral changes, hepatosplenomegaly, and Kayser-Fleischer rings. Which test is definitive for the diagnosis?

- (A) Urinary copper
- (B) Serum ceruloplasmin
- (C) Hepatic parenchymal copper concentration
- (D) Genetic testing for ATP7B mutation

Correct Answer: (B) Serum ceruloplasmin

Solution:

This clinical scenario describes a 13-year-old boy with symptoms suggestive of Wilson's disease, a genetic disorder causing copper accumulation in the body. Symptoms include jaundice, fatigue, tremors, behavioral changes, hepatosplenomegaly, and Kayser-Fleischer rings. To confirm Wilson's disease, testing copper metabolism and related markers is critical.

Among the diagnostic tests listed, **Serum ceruloplasmin** is the most relevant choice. Ceruloplasmin, a copper-carrying protein, and levels are typically low in Wilson's disease—making it a valuable indicator for diagnosis.

Here's a breakdown of the other options:

- **Urinary copper:** Elevated in Wilson's disease but not definitive alone.
- **Hepatic parenchymal copper concentration:** It provides a direct measure of copper overload and is very accurate but more invasive.
- **Genetic testing for ATP7B mutation:** Confirms genetic cause but may not be conclusive if symptoms are absent.

Thus, measuring **serum ceruloplasmin** offers a straightforward and non-invasive approach to support the diagnosis of Wilson's disease based on the described symptoms.

Quick Tip: For diagnosing Wilson's disease, serum ceruloplasmin levels are a key marker to confirm the diagnosis. This condition also presents with neurologic symptoms and hepatic enlargement.

24. A patient presents with xanthomas on the Achilles tendon. Which of the following is the most likely diagnosis?

- (A) Familial hypercholesterolemia
- (B) Tangier disease
- (C) Familial hyperchylomicronemia
- (D) Type III hyperlipoproteinemia

Correct Answer: (A) Familial hypercholesterolemia

Solution:

A patient presenting with xanthomas on the Achilles tendon is most likely suffering from **Familial hypercholesterolemia**. Here's why:

Xanthomas are cholesterol-rich deposits that often appear on tendons such as the Achilles tendon. They are a hallmark indicator of certain types of hyperlipidemia.

- **Familial hypercholesterolemia:** This condition is characterized by high levels of low-density lipoprotein (LDL) cholesterol due to a genetic defect. Tendon xanthomas are a common clinical sign because of the accumulation of excess cholesterol in tendons.
- **Tangier disease:** This is a rare condition characterized by low levels of high-density lipoprotein (HDL) cholesterol. It is not commonly associated with tendon xanthomas.
- **Familial hyperchylomicronemia:** This involves elevated triglycerides rather than cholesterol, and is associated with eruptive xanthomas, not

tendon xanthomas.

- **Type III hyperlipoproteinemia:** Associated with elevated levels of intermediate-density lipoprotein (IDL), it typically leads to palmar xanthomas, not specifically tendon xanthomas.

The presence of xanthomas on the Achilles tendon is thus most consistent with **Familial hypercholesterolemia**.

Quick Tip: When diagnosing lipid disorders, look for signs like xanthomas, which are commonly found in familial hypercholesterolemia, especially at sites like the Achilles tendon.

25. A patient with multiple tendon xanthomas is found to have a serum cholesterol level of 398 mg/dL and an LDL level of 220 mg/dL. What is the most likely defect?

- (A) Lipoprotein lipase deficiency
- (B) LDL receptor defect
- (C) Defective Apo B-100
- (D) PCSK9 gain-of-function mutation

Correct Answer: (B) LDL receptor defect

Solution:

In biochemistry, multiple tendon xanthomas and elevated serum cholesterol and LDL levels are indicative of familial hypercholesterolemia. This condition is commonly caused by a defect in the **LDL receptor**. Let's break down why this is the most likely defect:

1. **Lipoprotein lipase deficiency:** This condition leads to hypertriglyceridemia, not hypercholesterolemia. It would result in elevated chylomicrons and VLDL rather than LDL.
2. **LDL receptor defect:** This is the most common cause of familial hypercholesterolemia. It results in elevated LDL levels because LDL particles

can't be taken up by the liver effectively, hence the buildup in the bloodstream.

3. **Defective Apo B-100:** While this could also cause elevated LDL, it typically presents less severely than an LDL receptor defect and is less common.
4. **PCSK9 gain-of-function mutation:** This would increase LDL levels but is less common than an LDL receptor defect. Plus, the presence of tendon xanthomas strongly points toward familial hypercholesterolemia due to an LDL receptor defect.

Given these considerations, the **LDL receptor defect** is the most likely cause of the observed symptoms in this patient.

Quick Tip: In cases of familial hypercholesterolemia, look for tendon xanthomas and significantly elevated LDL levels. The defect usually lies in the LDL receptor.

26.

A 30-year-old patient presents with a history of flat lesions near the anal canal, rashes on the body, and hair loss that follows a particular pattern, as shown in the image. What is the diagnosis?



- (A) Trichotillomania
- (B) Alopecia areata
- (C) Secondary syphilis
- (D) Malassezia

Correct Answer: (C) Secondary syphilis

Solution:

The presented case describes a 30-year-old patient with flat lesions near the anal canal, body rashes, and a specific pattern of hair loss. These symptoms align with **secondary syphilis**, an infectious disease caused by the bacterium *Neisseria pallidum*. The condition is characterized by:

- **Flat lesions (condylomata lata):** These often appear in moist areas such as near the anal region.
- **Body rashes:** Typically affect the trunk and extremities and can be on the palms and soles, usually not itchy.
- **Alopecia syphilitica:** Moth-eaten pattern of hair loss which is patchy and non-cicatricial.

These clinical features support the diagnosis of secondary syphilis rather than the other options listed:

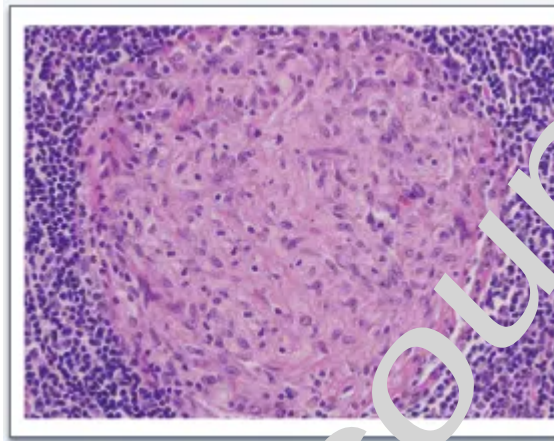
- *Trichotillomania:* Involves self-induced hair pulling, lacks associated skin rashes or lesions.
- *Alopecia areata:* Non-scarring hair loss with smooth bald patches, no skin lesions or rashes.
- *Malassezia:* Causes tinea versicolor; typically results in hypopigmented or hyperpigmented skin patches without hair loss.

Thus, given the symptoms presented, secondary syphilis is the most likely diagnosis.

Quick Tip: In cases of secondary syphilis, remember the characteristic rash, mucosal lesions, and distinctive hair loss pattern. Confirm with serologic testing for syphilis.

27.

A 38-year-old patient with hypopigmented nodular lesions with anesthesia over arm with ulnar nerve involvement underwent a biopsy and intradermal antigen test. Based on the image, which statement regarding the condition is most accurate?



- (A) Tuberculoid leprosy with a positive antigen test
- (B) Lepromatous leprosy with a positive antigen test
- (C) Erythema nodosum leprosum with a negative antigen test
- (D) Lepromatous leprosy with a negative antigen test

Correct Answer: (D) Lepromatous leprosy with a negative antigen test

Solution:

The clinical presentation described involves a 38-year-old patient with hypopigmented nodular lesions, anesthesia over the arm, and ulnar nerve involvement, suggesting a type of leprosy. The biopsy and intradermal antigen test results are crucial for diagnosis.

Leprosy caused by *Mycobacterium leprae*, manifests in two polar forms: tuberculoid and lepromatous leprosy, with a spectrum in between. The key points about the antigen test, known as the lepromin test, include:

- Tuberculoid leprosy:** Strong immune response with granuloma formation; typically positive lepromin test.
- **Lepromatous leprosy:** Poor immune response with widespread infection; typically negative lepromin test.

In this case, the **lepromatous leprosy** option aligns correctly because it matches the symptoms described (nodular lesions and ulnar nerve involvement) and a **negative antigen test**, which is consistent with the weak cellular immune response typically seen in lepromatous leprosy.

The correct answer is indeed **Lepromatous leprosy with a negative antigen test**, fitting both clinical and diagnostic features described.

Quick Tip: In cases of lepromatous leprosy, look for nerve involvement and skin lesions. A negative antigen test helps distinguish this from other types of leprosy.

28. A singer is finding difficulty raising the pitch of her voice. On examination, her vocal cords were depressed and bowing. Which of the following muscles is involved?

- (A) Cricothyroid
- (B) Interarytenoid
- (C) Posterior cricoarytenoid
- (D) Lateral arytenoid

Correct Answer: (A) Cricothyroid

Solution:

In this scenario, the singer is having difficulty raising the pitch of her voice due to depressed and bowed vocal cords. The problem appears to be associated with the muscles controlling the tension and length of the vocal cords.

The muscle primarily responsible for increasing the tension of the vocal cords, thus raising the pitch, is the **cricothyroid muscle**. This muscle functions by tilting the thyroid cartilage forward, which stretches and tenses the vocal cords, enabling higher pitch production.

Let's consider the roles of the muscles provided in the options:

- **Cricothyroid:** Increases tension in the vocal cords to raise pitch. This is the correct answer.
- **Interarytenoid:** Closes the posterior glottis; involved in adduction of vocal cords but not in raising pitch.
- **Posterior cricoarytenoid:** Abducts the vocal cords; primarily involved in opening the glottis for breathing, not in pitch alteration.
- **Lateral arytenoid:** Adducts the vocal cords; it closes the glottis, also not involved in altering pitch.

Thus, the muscle involved in raising the pitch of the voice, given the symptoms, is indeed the **cricothyroid muscle**.

Quick Tip: When a patient has difficulty raising the pitch of their voice with vocal cord bowing, think of the cricothyroid muscle involvement.

29. A 45-year-old woman is diagnosed with right vestibular neuritis. What findings are expected during the head impulse test in this patient?

- (A) When the head is turned to the left, the eyeballs move to the left with Nystagmus.
- (B) When the head is turned to the left, the eyeballs move to the right with nystagmus.
- (C) When the head is turned to the right, the eyeballs move to the left with Nystagmus.
- (D) When the head is turned to the right, the eyeballs move to the right with nystagmus.

Correct Answer: (C) When the head is turned to the right, the eyeballs move to the left with Nystagmus.

Solution:

The head impulse test is used to assess the function of the vestibulo-ocular reflex (VOR), which stabilizes gaze during rapid head movements. In this case, the

patient has right vestibular neuritis, indicating impaired function on the right side of the vestibular system.

Explanation: In a normal VOR, when the head is turned quickly to one side (e.g., to the right), the eyes reflexively move in the opposite direction (e.g., to the left) to maintain steady gaze on a target. If the right vestibular apparatus is damaged, such as in right vestibular neuritis, it cannot properly convey signals during a rightward head impulse.

Expected Findings:

- During a rapid head turn to the right, the VOR should cause the eyes to move left. However, in right vestibular neuritis, the impaired response results in inadequate compensatory eye movement.
- This causes a catch-up saccade to the left, as the eyes attempt to fixate back on the target.
- This manifests as an observable fast-phase nystagmus to the left.

Conclusion: During the head impulse test for a patient with right vestibular neuritis, when the head is turned quickly to the right, the expected finding is that the eyeballs will move to the left with a corrective saccade (nystagmus) to refocus on the target.

Head Turn Direction Expected Eye Movement

Right	Left with Nystagmus
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Quick Tip: For vestibular neuritis, remember that the head impulse test will show abnormal eye movement toward the unaffected side (opposite of the impaired ear).

30. In a medicolegal examination, the accused 18-year-old male claims he is 16 years old. Which joint x-ray should be done?

- (A) Head & shoulder
- (B) Elbow and ankle
- (C) Knee and wrist
- (D) Elbow & hip

Correct Answer: (C) Knee and wrist

Solution:

In medicolegal examinations where age determination is necessary, assessment of bone development is critical. At 18 years of age, a male will generally have completed certain stages of ossification that can be verified by x-rays.

Bones of particular interest in these cases include those where the growth plates (epiphyseal plates) fuse last. In males, significant ossification occurs at:

- Wrist and hand - typically used for age determination from around 14 to 19 years.
- Knee - with ossification centers continually developing around this age are typically visible in knee x-rays, particularly the distal ends of the femur and proximal ends of the tibia.

Therefore, x-rays of the **knee and wrist** would provide crucial information to determine whether the claimed age of 16 aligns with the physiological development indicative of an 18-year-old individual.

Ossification completion varies, however, this examination helps in giving an approximate age which can be cross-referenced with other data to determine the correct age, especially in forensic contexts.

Quick Tip In forensic age estimation, the knee and wrist are preferred joints for x-rays due to their sensitivity to age-related ossification changes.

31. Police brought a person from the railway track with features of a dry, dilated pupil, dry skin, slurring of speech, and altered sensorium. The poisoning is?

- (A) Morphine
- (B) Cannabis
- (C) Datura
- (D) Alcohol

Correct Answer: (C) Datura

Solution:

The scenario describes a case of poisoning with specific symptoms: dry, dilated pupils, dry skin, slurred speech, and altered sensorium. Let's break down these symptoms:

- Dry, dilated pupils and dry skin suggest an anticholinergic toxidrome.
- Slurred speech and altered sensorium can also be associated with central nervous system effects of anticholinergic agents.

Among the given options, **Datura** poisoning matches this profile. Datura contains anticholinergic substances such as atropine, scopolamine, and hyoscyamine, which lead to symptoms like dry mouth, mydriasis (dilated pupils), dry skin, and altered mental status. These are recognized signs of anticholinergic toxicity.

Let's look at why other options do not fit:

- **Morphine:** An opiate that typically causes miosis (constricted pupils), respiratory depression, and decreased level of consciousness, not consistent with dry skin and dilated pupils.
- **Cannabis:** Might cause altered sensorium and conjunctival injection, but not dry skin or dilated pupils.
- **Alcohol:** Primarily causes slurred speech and altered sensorium, but lacks the other anticholinergic features like dry skin and dilated pupils.

Therefore, the most accurate diagnosis considering the symptoms is **Datura** poisoning.

Quick Tip: In cases of suspected anticholinergic poisoning, Datura should be considered, especially if the patient exhibits classic signs like dry skin and dilated pupils.

32. The flexion point in a ventouse delivery is located at which of the following positions on the fetal head?

- (A) 3 cm posterior to the anterior fontanelle
- (B) 3 cm anterior to the posterior fontanelle
- (C) 6 cm anterior to the posterior fontanelle
- (D) Midway between the anterior and posterior fontanelle

Correct Answer: (B) 3 cm anterior to the posterior fontanelle

Solution:

In the context of ventouse (vacuum) delivery, the flexion point on the fetal head is an important anatomical landmark. Correct positioning of the ventouse cup is essential to provide effective traction during delivery without causing harm to the fetus.

The **flexion point** is located at **3 cm anterior to the posterior fontanelle**. The posterior fontanelle is located at the junction of the sagittal suture and the lambdoid suture on the fetal skull, and moving 3 cm anteriorly from this point positions the cup correctly to achieve optimal traction while ensuring minimal strain on the skull and neck of the fetus.

By selecting the option of "3 cm anterior to the posterior fontanelle," the healthcare provider ensures the ventouse is placed in the correct position to assist in the delivery process effectively.

Quick Tip: During a ventouse delivery, the flexion point should be approximately 3 cm anterior to the posterior fontanelle to ensure safe and effective use of the vacuum.

33.

Identify the instrument shown below



- (A) Kielland
- (B) Wrigley
- (C) Pipers
- (D) None of the above

Correct Answer: (C) Pipers

Solution:

The instrument shown in the image is identified as a "Pipers" forceps.

This instrument is commonly used in surgical procedures, particularly in the field of obstetrics. It is specifically designed for the facilitation of labor by helping in the delivery of the fetal head. Its unique shape and structure make it suitable for this purpose compared to other instruments.

Among the given options:

- **Kielland Forceps:** These are used for rotation of the fetal head during difficult labor, known for their sliding lock.
- **Wrigley Forceps:** These are short forceps used for low or outlet forceps delivery, mainly when the fetal head is already in the pelvic outlet.

- **Pipers Forceps:** Specifically designed for aftercoming head in breech deliveries, distinguished by their unique curve.

The correct choice of the instrument in the given image is **Pipers**.

Quick Tip: When identifying obstetric forceps, pay attention to the curvature and the specific purpose of the forceps, such as rotation for Pipers or traction for Wrigley.

34. The patient is having a headache and confusion. A brain tumor diagnosis is made. Family history reveals brain and kidney tumors. Choose the correct option.

- (A) Neurofibromatosis
- (B) Li fraumeni syndrome
- (C) VHL syndrome
- (D) Churg Strauss syndrome

Correct Answer: (C) VHL syndrome

Solution:

In the given scenario, the patient's symptoms and family history provide crucial clues for diagnosing the correct syndrome. The patient presents with:

- Headache and confusion, indicative of a neurological issue.
- Diagnosis of a brain tumor.
- Family history of brain and kidney tumors.

These observations guide us toward a syndrome associated with both brain and kidney tumors:

Consider:

- **Neurofibromatosis:** Usually involves skin changes, cafe-au-lait spots, and nerve-related tumors, but not typically associated with kidney tumors.
- **Li-Fraumeni syndrome:** Known for a wide range of cancers, including brain tumors, but kidney tumors are less common.

- **VHL syndrome (Von Hippel-Lindau syndrome):** Characterized by hemangioblastomas (brain tumors) and renal cell carcinoma (kidney tumors), among other cysts and tumors. The family history of both brain and kidney tumors aligns well with VHL syndrome.
- **Churg-Strauss syndrome:** An eosinophilic condition associated with asthma and vasculitis, not typically brain and kidney tumors.

Based on these options, **VHL syndrome** is the most likely diagnosis, as it is known for associated brain and kidney tumors, directly matching the patient's family history and current diagnosis.

Quick Tip: In cases of familial brain and kidney tumors, consider VHL syndrome, especially when hemangioblastomas or renal cell carcinoma are involved.

35. A 62-year-old patient presents with left-sided arm and leg weakness, right-sided facial paralysis, and difficulty with horizontal eye movements. Based on the clinical presentation, which of the following syndromes is most consistent with these symptoms?

- (A) Foville syndrome
- (B) Benedict's syndrome
- (C) Millard-Gubler syndrome
- (D) Wallenberg syndrome

Correct Answer: (C) Millard-Gubler syndrome

Solution

The clinical presentation of this patient involves left-sided arm and leg weakness, right-sided facial paralysis, and difficulty with horizontal eye movements. To determine the syndrome, we need to analyze these symptoms based on neurological pathways and their anatomical localization.

Analysis:

- Left-sided arm and leg weakness suggests a lesion on the right side of the brainstem or above, affecting the corticospinal tract.
- Right-sided facial paralysis indicates an involvement of the facial nerve or its nuclei on the right side.
- Difficulty with horizontal eye movements points towards a disruption in the pons, specifically affecting structures that control ocular motility, such as the abducens nerve.

Syndrome Assessment:

- **Foville syndrome:** Characterized by contralateral hemiplegia and ipsilateral palsy of cranial nerves causing facial paralysis, but more closely linked with ocular palsies not specific to the given case.
- **Benedict's syndrome:** Not consistent as it involves midbrain lesions and is characterized by ipsilateral oculomotor nerve palsy with contralateral tremor.
- **Millard-Gubler syndrome:** This occurs due to a lesion in the pons affecting the corticospinal tract and facial nerve, leading to contralateral hemiparesis and ipsilateral facial paralysis. The difficulty with horizontal eye movements further implies pontine involvement.
- **Wallenberg syndrome:** Associated with lateral medullary infarction, not exhibiting the described combination of facial and limb motor symptoms.

Conclusion: The symptoms best align with *Millard-Gubler syndrome*, which accounts for both the motor and cranial nerve deficits described. This syndrome perfectly matches the presentation of left arm and leg weakness with right facial paralysis caused by lesions in the lateral pons.

Quick Tip: In patients with a combination of facial paralysis, hemiparesis, and eye movement difficulties, think of Millard-Gubler syndrome and consider a lesion in the pons.

36.

A patient presents with painful vesicles in the genital region. Identify the lesion shown in the image and choose the correct diagnosis.



- (A) Herpes
- (B) Chancroid
- (C) Syphilis
- (D) Candidiasis

Correct Answer: (A) Herpes

Solution:

Solution: The case presented involves a patient displaying painful vesicles in the genital region. To diagnose this condition, we need to evaluate the characteristics and symptoms associated with each provided option:

- **Herpes:** Typically presents as grouped, painful vesicles on erythematous base. Lesions may burst and form ulcers. Caused by Herpes Simplex Virus (HSV).
- **Chancroid:** Characterized by painful, necrotic ulcers with irregular borders. Often associated with inguinal lymphadenopathy. Caused by *Haemophilus ducreyi*.
- **Syphilis:** Primary syphilis presents as a single, painless ulcer called a chancre. Caused by *Treponema pallidum*.
- **Candidiasis:** Typically causes itching, redness, and white patches but not vesicles. Caused by *Candida* species.

Based on the description of painful vesicles in the genital region, **Herpes** is the most fitting diagnosis. Therefore, the correct answer is:

Herpes

Quick Tip: For painful genital vesicles, think of herpes simplex virus. If the vesicles are grouped and painful, it's highly suggestive of HSV infection.

37. A patient presents with perianal itching. A peripheral swab was taken, and the image below shows the findings. What is the most likely diagnosis?

- (A) H Nana
- (B) Ancylostoma
- (C) Enterobius vermicularis
- (D) Necator Americanus

Correct Answer: (C) Enterobius vermicularis

Solution:

To determine the most likely diagnosis based on the presented symptoms and findings, we need to analyze the given information.

The key symptom here is "perianal itching," which is a classic sign of an infection commonly caused by the parasite *Enterobius vermicularis*. This condition is also known as enterobiasis, and it's caused by pinworms. The perianal itching is a result of the female worms laying eggs around the anus, typically at night, leading to irritation and itching.

Given the options:

H Nana

Ancylostoma

Enterobius vermicularis

Necator Americanus

Enterobius vermicularis is the most appropriate choice because:

- **Hymenolepis nana (H. Nana):** Commonly known as the dwarf tapeworm, it does not typically cause perianal itching. It is associated with mild gastrointestinal symptoms.

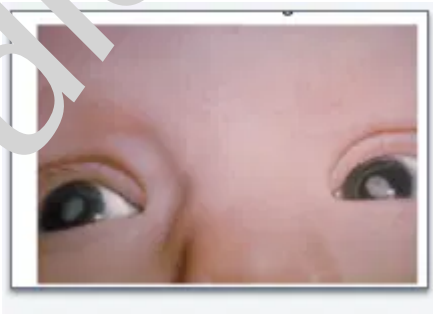
- **Ancylostoma:** These are hookworms that cause different symptoms such as abdominal discomfort, iron-deficiency anemia, and skin eruptions but are less associated with perianal itching.
- **Necator americanus:** Similar to Ancylostoma, this is another hookworm species causing ancylostomiasis with symptoms not including specific perianal itching.

Therefore, the most likely diagnosis given the symptom of perianal itching and the common characteristics of *Enterobius vermicularis* is indeed **Enterobius vermicularis**.

Quick Tip: In cases of perianal itching, especially at night, consider *Enterobius vermicularis*. Perform the "tape test" to detect pinworm eggs.

38.

A 2-month-old child is brought to the ophthalmology OPD with the following presentation. What is the ideal management?



- (A) Medical management
- (B) Operate immediately
- (C) Surgery after 6 months
- (D) Surgery after 2 years

Correct Answer: (B) Operate immediately

Solution:

A 2-month-old child presenting to the ophthalmology department suggests an urgent condition. In pediatric ophthalmology, certain conditions require immediate attention to prevent long-term vision impairment or other complications.

The question provides the following management options:

- Medical management
- Operate immediately
- Surgery after 6 months
- Surgery after 2 years

In this scenario, we must consider conditions that necessitate prompt surgical intervention in infants. One such condition is congenital cataract, which can lead to significant developmental visual impairment if not treated promptly.

Reason for Immediate Operation:

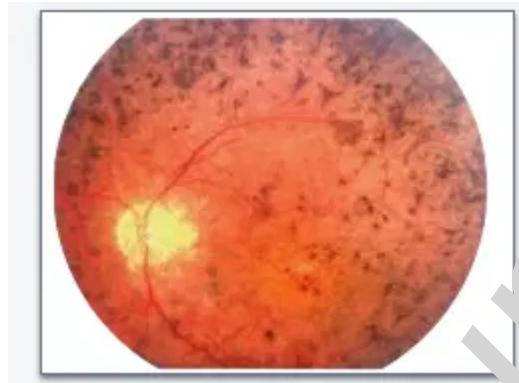
- In cases like congenital cataracts, delaying surgery can result in deprivation amblyopia (lazy eye) due to inadequate visual stimulus during the critical period of visual development.
- Immediate or early surgery within the first few months of life optimizes visual prognosis and prevents irreversible vision loss.
- For other congenital obstructions or structural abnormalities of the eye present at birth, immediate intervention is often necessary to ensure proper development.

Thus, given the age and the urgency inferred by the options, **operating immediately** is the ideal management for such conditions to ensure the best possible visual outcomes.

Quick Tip: For congenital cataracts, surgery is generally recommended within the first few months of life to prevent amblyopia and optimize visual development.

39.

A patient presents with a gradual loss of night vision and peripheral vision. What is the most likely diagnosis based on fundoscopy findings?



- (A) Retinitis pigmentosa
- (B) Retinal hemorrhage
- (C) Diabetic retinopathy
- (D) Hypertensive retinopathy

Correct Answer: (A) Retinitis pigmentosa.

Solution:

The patient in question presents with symptoms of gradual loss of night vision and peripheral vision. To determine the most likely diagnosis, we utilize a fundoscopy, which examines the fundus (the interior surface of the eye) for specific findings. Each potential diagnosis can be ruled in or out based on characteristic fundoscopy findings:

- **Retinitis pigmentosa:** On fundoscopy, this hereditary condition typically presents with bone spicule-shaped pigmentation, attenuated retinal vessels, and a waxy pallor of the optic disc. These findings correlate with the patient's symptoms of night blindness and peripheral vision loss.
- **Retinal hemorrhage:** In this condition, fundoscopy would reveal bleeding spots in different retinal layers, not necessarily linked to the presented symptoms.
- **Diabetic retinopathy:** This would show microaneurysms, hemorrhages, exudates, and possibly neovascularization, related more directly to systemic diabetes and not commonly leading to early night-blindness.

- **Hypertensive retinopathy:** Characterized by microvascular changes like arterial narrowing and cotton wool spots, this condition usually coincides with systemic hypertension.

The clinical description and the expected finding of bone spicules on fundoscopy make **Retinitis pigmentosa** the most likely diagnosis.

Quick Tip: In cases of gradual vision loss, especially with night blindness and peripheral vision loss, think of retinitis pigmentosa. Early diagnosis and genetic counseling are key.

40.

A man presents with back pain following a road traffic accident. There was no history of neurological deficit. X-ray spine is done. What is the diagnosis?



- (A) Spinous process fracture
- (B) Chance fracture
- (C) Fracture of base of vertebrae
- (D) Compressed fracture

Correct Answer: (A) Spinous process fracture

Solution:

Solution:

In the context of a patient presenting with back pain following a road traffic accident and no neurological deficits, the key steps in identifying the correct diagnosis from an X-ray involve recognizing characteristic patterns associated with different types of fractures. Let's break down the options:

- **Spinous Process Fracture:** This type of fracture specifically involves a crack or break in the spinous process, which is the bony protrusion on the posterior aspect of a vertebra. It is often caused by direct trauma or sudden forceful flexion or extension of the spine.
- **Chance Fracture:** This is a horizontal fracture through the spinal vertebra, often involving the vertebral body, pedicles, and spinous process. It is usually associated with flexion-distraction injuries, often seen in high-speed accidents where seat belts provide an abrupt halting force.
- **Fracture of Base of Vertebrae:** This indicates a break at the base of the vertebra, involving substantial structural components and would likely present with some neurological deficit depending on the extent.
- **Compressed Fracture:** These involve the collapse of a vertebral body, often seen in conditions like osteoporosis or due to axial loading trauma. They might cause anterior wedge shape in vertebrae but may not directly account for isolated spinous process involvement.

The absence of neurological deficits in the described scenario is particularly important. A spinous process fracture generally does not lead to neurological dysfunction because it does not impinge on the spinal cord or nerve roots. The image provided in the question likely displays the bony projections of the spinous part to assist in confirming this diagnosis.

Therefore, considering the information, the most accurate diagnosis is a **Spinous Process Fracture**.

Quick Tip: For isolated back pain without neurological deficits following trauma, consider a spinous process fracture. This injury is often less severe than other spinal fractures.

41.

A child presents with growth failure. Biochemical analysis shows normal Ca^{2+} , normal PTH, reduced phosphate, and increased ALP. What is the diagnosis?



- (A) Nutritional rickets
- (B) Hypophosphatemic rickets
- (C) Type 1 VDDR
- (D) Type 2 VDDR

Correct Answer: (B) Hypophosphatemic rickets

Solution:

The case involves a child presenting with growth failure and specific biochemical findings: normal calcium (Ca^{2+}), normal parathyroid hormone (PTH), reduced phosphate levels, and increased alkaline phosphatase (ALP). To diagnose, we analyze these results:

- **Normal Ca^{2+} and PTH:** Indicates that calcium regulation is not affected, often ruling out conditions related to calcium metabolism abnormalities.
- **Reduced Phosphate:** Suggests a phosphate handling issue, as phosphate is crucial for bone mineralization.
- **Increased ALP:** Often indicates increased bone turnover or growth, commonly seen in rickets and osteomalacia related to defective bone mineralization.

The key points here are normal PTH and Ca^{2+} , combined with low phosphate levels. These findings suggest a form of rickets not related to vitamin D

deficiency, particularly when vitamin D levels are not accounted for indicating a different etiology.

Identifying Hypophosphatemic Rickets: This condition is characterized by genetic causes leading to phosphate wasting at the kidney level, resulting in hypophosphatemia (low serum phosphate). It is not related to vitamin D deficiency or insufficiency, thus ruling out nutritional rickets, Type 1 VDDR (Vitamin D Dependent Rickets Type 1), and Type 2 VDDR.

Given the biochemical profile:

- Growth failure
- Normal Ca^{2+}
- Normal PTH
- Reduced phosphate
- Increased ALP

The diagnosis of **Hypophosphatemic Rickets** is confirmed, as it aligns with all presented findings.

Quick Tip: In cases of rickets with normal calcium and PTH, but low phosphate and high ALP, consider hypophosphatemic rickets. Phosphate deficiency is the hallmark.

42. A patient presents with fever, hepatosplenomegaly, abdominal pain, and WBC count $> 50,000/\text{mm}^3$. Which of the following genetic abnormalities is involved?

- (A) $t(9;22)$
- (B) $\text{del}(11)$
- (C) $t(15;17)$
- (D) $\text{del}(5;1)$

Correct Answer: (A) $t(9;22)$

Solution:

This problem relates to the identification of a genetic abnormality based on clinical presentation and laboratory findings. The key characteristics mentioned in the scenario are:

- Fever
- Hepatosplenomegaly
- Abdominal pain
- WBC count $> 50,000/\text{mm}^3$

These clinical features suggest a hematological disorder, likely a form of leukemia.

The genetic abnormality **t(9;22)** is indicative of the Philadelphia chromosome, commonly associated with Chronic Myeloid Leukemia (CML). CML is characterized by a dramatically elevated white blood cell count and an enlarged spleen (hepatosplenomegaly), which align with the patient's symptoms and lab findings.

Other genetic anomalies listed as options are:

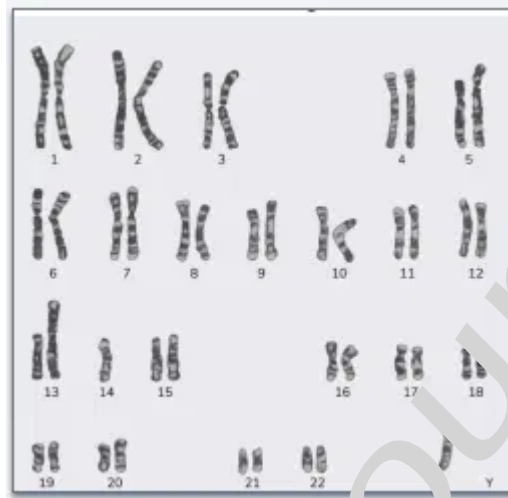
- **del(1q)** – Often associated with multiple myeloma, but not typically presenting with these symptoms.
- **t(15;17)** – Associated with Acute Promyelocytic Leukemia (APL), marked by coagulopathy, not the predominant features described.
- **del(3q)** – Can be involved in various hematologic malignancies but is not specifically involved with a presentation matching this case.

Therefore, given the connection between the symptoms and the WBC count, the correct genetic abnormality involved in this case is: **t(9;22)**.

Quick Tip When a patient presents with high WBC count, hepatosplenomegaly, and abdominal pain, consider CML, especially if the Philadelphia chromosome (t(9;22)) is detected.

43.

A 23-year-old female with a height of 4 feet has a karyotype, as shown in the image below. Which of the following conditions is the most likely etiology?



- (A) Turner syndrome
- (B) Klinefelter syndrome
- (C) Mayer-Rokitansky-Küster-Hauser syndrome (MRKHS)
- (D) Edwards syndrome

Correct Answer: (A) Turner syndrome

Solution:

The question indicates that a 23-year-old female has a specific karyotype and is only 4 feet tall. Given the options provided, we need to identify the most likely etiology for her condition. Let's analyze the possibilities:

- **Turner syndrome:** Characterized by a chromosomal anomaly where there is a complete or partial absence of one of the sex chromosomes, typically present as 45,X. Common features include short stature, usually around 4 feet 3 inches, and other distinct phenotypic characteristics.
- **Klinefelter syndrome:** Occurs in males and results from the presence of an extra X chromosome (47,XXY), leading to symptoms like tall stature and gynecomastia, contrary to this case.
- **Mayer-Rokitansky-Küster-Hauser syndrome (MRKHS):** Affects females and involves congenital absence of the uterus and vagina, typically without notable height differences.

- **Edwards syndrome:** Also known as Trisomy 18, characterized by severe developmental delays and growth deficiencies.

Given the height of 4 feet and the need to consider a chromosomal abnormality, Turner syndrome fits best as it explains the significant short stature and the likelihood of a specific karyotype anomaly. Thus, Turner syndrome is the most probable etiology for her condition.

Quick Tip: In a female with short stature and a 45,X karyotype, consider Turner syndrome. Additional features include a webbed neck and absent or underdeveloped ovaries.

44. An infant presents with vomiting after feeding. A Benedict's test was performed and returned positive for a non-glucose substance. Which of the following is the most likely diagnosis?

- (A) Galactosemia due to GAL-1-P uridyl transferase enzyme deficiency
- (B) Hereditary fructose intolerance due to aldolase B deficiency
- (C) Glucose-6-Phosphate dehydrogenase (G6PD) deficiency
- (D) Galactosemia due to galactokinase enzyme deficiency

Correct Answer: (A) Galactosemia due to GAL-1-P uridyl transferase enzyme deficiency

Solution:

The given scenario describes an infant who exhibits vomiting after feeding. The positive Benedict's test indicates the presence of a reducing sugar that is not glucose.

The conditions to consider are:

- **Galactosemia due to GAL-1-P uridyl transferase enzyme deficiency:** This condition results in the accumulation of galactose-1-phosphate, galactitol, and free galactose in the blood. Infants present with vomiting, jaundice, and

hepatomegaly shortly after starting milk feeding. Galactose, being a reducing sugar, will lead to a positive Benedict's test.

- **Hereditary fructose intolerance due to aldolase B deficiency:** Symptoms occur after the ingestion of fructose-containing foods, typically presenting later after weaning from breast milk, as it requires the ingestion of fructose. It does not match the immediate onset after feeding as described in the question.
- **Glucose-6-Phosphate dehydrogenase (G6PD) deficiency:** This condition is related to hemolytic anemia triggered by certain drugs, foods, or infections; it does not typically present with vomiting after feeding and does not cause a positive Benedict's test.
- **Galactosemia due to galactokinase enzyme deficiency:** This causes accumulation of galactose in the blood, which also tests positive on Benedict's test, but is less severe compared to GAL-1-P uridyl transferase deficiency and primarily presents with cataracts.

The most likely diagnosis given the immediate and severe symptoms after milk ingestion and the positive Benedict's test for a non-glucose reducing substance is **Galactosemia due to GAL-1-P uridyl transferase enzyme deficiency.**

Quick Tip: In infants with vomiting after feeding and a positive Benedict's test, consider galactosemia. The absence of GAL-1-P uridyl transferase enzyme activity is the most common cause.

45.

Which neonatal anomaly is depicted in the image?



- (A) Omphalocele
- (B) Gastroschisis
- (C) Patent vitello intestinal duct
- (D) Exstrophy bladder

Correct Answer: (D) Exstrophy bladder

Solution:

To determine the correct neonatal anomaly from the given options, it is important to understand each condition:

- **Omphalocele:** This condition is characterized by an abdominal wall defect through which the intestines and sometimes other organs protrude into a sac covered by a membrane.
- **Gastroschisis:** This involves an abdominal wall defect near the umbilicus, through which the intestines protrude without a protective sac.
- **Patent vitello intestinal duct:** A rare condition where the vitelline duct fails to close, potentially leading to various complications such as a fistula.
- **Exstrophy bladder:** This anomaly involves the improper closure of the abdominal wall, leading to the exposure of the bladder and, sometimes, the

urethra, without any protective coverage.

The image referenced is not visible here, but based on the provided correct answer choice, we interpret the neonatal anomaly depicted as **Exstrophy bladder**. This condition is characterized by the bladder being outside the abdominal cavity, exposed and visible, typically without any covering sac or protective layer.

Quick Tip: Exstrophy bladder involves the externalization of the bladder. Look for signs like an exposed bladder in the lower abdomen in neonates, which requires immediate surgical management.

46. Which of the following statements is incorrect regarding Samter's triad?

- (A) It is only triggered by aspirin
- (B) Other NSAIDs with COX-1 blocking ability can also trigger symptoms.
- (C) It is characterized by asthma, nasal polyps, and aspirin sensitivity.
- (D) It involves overproduction of leukotrienes.

Correct Answer: (A) It is only triggered by aspirin

Solution:

Samter's triad, also known as aspirin-exacerbated respiratory disease (AERD), is a chronic medical condition characterized by three key elements: asthma, nasal polyps, and sensitivity to aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs). The following analysis evaluates each provided statement regarding Samter's triad:

- The statement "It is only triggered by aspirin" is incorrect. Samter's triad is not exclusively triggered by aspirin; other NSAIDs, specifically those with cyclooxygenase-1 (COX-1) inhibiting properties, can also precipitate symptoms. This includes ibuprofen and naproxen, among others.
- The statement "Other NSAIDs with COX-1 blocking ability can also trigger symptoms" is correct. The COX-1 enzyme inhibition leads to an

overproduction of leukotrienes, which are potent inflammatory mediators leading to the exacerbation of respiratory symptoms characteristic of the condition.

- The statement "It is characterized by asthma, nasal polyps, and aspirin sensitivity" accurately describes the clinical triad of conditions in affected individuals.
- The statement "It involves overproduction of leukotrienes" is true. The pathophysiology of Samter's triad involves increased leukotriene production due to the inhibition of the cyclooxygenase pathway, redirecting arachidonic acid metabolism to the lipoxygenase pathway.

In summary, the incorrect statement is "It is only triggered by aspirin," as the condition can be exacerbated by a range of NSAIDs, not just aspirin.

Quick Tip: In Samter's triad, COX-1 inhibitors like aspirin and NSAIDs can worsen symptoms. The overproduction of leukotrienes is a key feature of this disease.

47. Aprepitant, a drug used to prevent late-onset chemotherapy-induced nausea and vomiting, acts through which of the following mechanisms?

- (A) NK-1 antagonist
- (B) NK-1 agonist
- (C) NK-3 antagonist
- (D) NK-2 antagonist

Correct Answer: (A) NK-1 antagonist

Solution:

Aprepitant is a medication used to prevent nausea and vomiting caused by chemotherapy. It achieves this by targeting specific receptors in the body that play a role in these symptoms.

The mechanism of action for Aprepitant involves its role as an **NK-1 antagonist**. The NK-1 (Neurokinin-1) receptor is associated with the emetic (vomiting) reflex.

By acting as an antagonist at these receptors, Aprepitant can effectively block the action of substance P, a neurotransmitter that binds to NK-1 receptors and induces nausea and vomiting.

The options provided for the mechanism of action were:

- NK-1 antagonist
- NK-1 agonist
- NK-3 antagonist
- NK-2 antagonist

Considering the pharmacological action of Aprepitant, the correct choice is **NK-1 antagonist**.

Quick Tip: Aprepitant is an NK-1 antagonist, effective in preventing chemotherapy-induced nausea and vomiting by blocking the action of substance P.

48. Sour taste is perceived by which receptors?

- (A) T1R1
- (B) T1R2
- (C) T1R3
- (D) TRPP3

Correct Answer: (D) TRPP3

Solution:

Sour taste is perceived by specific receptors known as TRPP3 channels. These are ion channels that play a crucial role in detecting sourness, which is typically associated with acidic substances that dissociate protons (H^+) in solution.

When we consume something sour, such as lemon juice, the acids contribute to the release of H^+ ions. These ions interact with the TRPP3 receptors located on

the taste cells of the tongue. The activation of these receptors generates a signal that the brain interprets as a sour taste.

Conclusion: TRPP3 receptors are responsible for the perception of sour taste, making them crucial in taste physiology.

Quick Tip: Sour taste is detected by TRPP3 receptors, which are activated by acidic substances like citric acid found in lemons and other sour foods.

49. Which ion is most responsible for the resting membrane potential (RMP)?

- (A) Potassium (K^+)
- (B) Calcium (Ca^{2+})
- (C) Sodium (Na^+)
- (D) Chloride (Cl^-)

Correct Answer: (A) Potassium (K^+)

Solution:

The resting membrane potential (RMP) of a cell is primarily determined by the distribution of ions across the cell membrane and the permeability of the membrane to these ions. The most significant ion in establishing the RMP is potassium (K^+). This is because:

1. **Concentration Gradient:** There is a higher concentration of K^+ inside the cell compared to outside. This concentration gradient drives the efflux of K^+ out of the cell.
2. **Membrane Permeability:** The cell membrane is more permeable to K^+ than to other ions such as Na^+ , Ca^{2+} , or Cl^- . This is due to the presence of potassium channels that allow K^+ to move more freely across the membrane.
3. **Electrochemical Gradient:** As K^+ leaves the cell, it creates a negative charge inside the cell relative to the outside. This electrical gradient opposes the further efflux of K^+ , stabilizing the RMP.

Therefore, due to these factors, potassium (K^+) plays the most significant role in establishing and maintaining the resting membrane potential.

Conclusion: Potassium (K^+) is the ion most responsible for the resting membrane potential (RMP).

Quick Tip: The resting membrane potential (RMP) is primarily maintained by potassium (K^+) ions, with the Na^+/K^+ ATPase pump helping to maintain the ion gradient.

50.

A fruit farmer presents with fever, respiratory difficulties, and neurological complications. What is the most likely diagnosis?



- (A) Ebola
- (B) Meningitis
- (C) Nipah
- (D) Zika

Correct Answer: (C) Nipah

Solution:

The question poses a scenario involving a fruit farmer with symptoms including fever, respiratory difficulties, and neurological complications. The task is to identify the most likely diagnosis from the provided options. Here is an analysis of each option:

- **Ebola:** Ebola virus presents with fever, severe headache, muscle pain, and in advanced stages, bleeding. Neurological symptoms are not primary manifestations and transmission is not typically linked to fruit farming.
- **Meningitis:** Meningitis symptoms include fever, headache, neck stiffness, and photophobia. While it involves neurological complications, respiratory difficulties are not common, and there's no direct association with fruit farming.
- **Nipah:** Nipah virus is associated with fever, respiratory symptoms, and severe neurological complications like encephalitis. Outbreaks have been linked to fruit consumption, especially contaminated by fruit bats.
- **Zika:** Zika virus primarily causes mild fever, rash, joint pain, and conjunctivitis. Neurological issues occur rarely, and respiratory symptoms are not typical. The link to fruit farming is weak.

Considering the symptoms and occupational context, the most likely diagnosis is **Nipah virus** due to its characteristic fever, respiratory, and neurological symptoms, combined with the known association of outbreaks with fruit handling and consumption.

Quick Tip: In regions with fruit bats, consider Nipah virus if the patient presents with fever, respiratory distress, and neurological symptoms like encephalitis.

51.

Which of the following vaccines is kept at the lowest level?



- (A) OPV
- (B) DPT
- (C) Hep B
- (D) Rota

Correct Answer: (A) OPV

Solution:

Explanation: In the context of vaccine storage, it is crucial to maintain vaccines at specific temperature ranges to preserve their efficacy and potency. Among the vaccines listed, Oral Polio Vaccine (OPV) is known to be the most temperature-sensitive.

OPV needs to be stored at the coldest temperatures, typically between -15°C and -25°C . This is because OPV is a live attenuated vaccine, meaning it contains weakened forms of the virus that can become ineffective if not stored properly. The ultra-cold storage requirements help in preserving its live virus components effectively.

Vaccine Storage Temperature

OPV	-15°C to -25°C
DPT	2°C to 8°C
Hep B	2°C to 8°C
Rota	2°C to 8°C

As shown in the table above, OPV is stored at the lowest temperature compared to DPT, Hep B, and Rota vaccines, which are stored within a range of 2°C to 8°C . Therefore, the correct answer is OPV.

Quick Tip: The OPV requires the lowest temperature in the vaccine cold chain, so ensure it is stored at -20°C to -30°C for optimal efficacy.

52. Which drug is used in the maintenance phase of opioid withdrawal?

- (A) Buprenorphine
- (B) Disulfiram
- (C) Butorphanol
- (D) Clonidine

Correct Answer: (A) Buprenorphine

Solution:

In the maintenance phase of opioid withdrawal, the primary objective is to stabilize the patient's condition and prevent relapse. Among the given options, the drug that is commonly used for maintenance therapy in opioid withdrawal is Buprenorphine.

Buprenorphine is favored due to its partial agonist properties at the mu-opioid receptor and antagonist properties at the kappa-opioid receptor. This dual action provides relief from withdrawal symptoms and reduces cravings while having a lower risk of abuse compared to full agonists like methadone.

Let's briefly examine the other options to understand why they are not suitable for maintenance therapy in opioid withdrawal:

- **Disulfiram:** This drug is used in alcohol dependence, not for opioid withdrawal. It works by producing unpleasant effects when alcohol is consumed.
- **Butorphanol:** This is a mixed agonist-antagonist opioid, typically used for pain relief rather than maintenance therapy in opioid withdrawal.
- **Clonidine:** This drug is often used to alleviate withdrawal symptoms during detoxification, but it is not typically used for long-term maintenance therapy.

Therefore, Buprenorphine is the appropriate choice for the maintenance phase of opioid withdrawal due to its efficacy in reducing cravings and relapse risk.

Quick Tip: For opioid withdrawal, buprenorphine is commonly used for maintenance therapy due to its partial agonist activity on opioid receptors.

53. A 45-year-old woman presents with a long-standing history of “feeling tensed” along with an upset stomach, diarrhea, and heartburn. She mentions that her family members also experience similar symptoms. Which of the following symptoms is most likely to be observed in this patient?

- (A) Neologisms
- (B) Tingling at extremities
- (C) Hallucinations
- (D) Idea of reference

Correct Answer: (B) Tingling at extremities

Solution:

The scenario described involves symptoms such as feeling tense, an upset stomach, diarrhea, and heartburn, which are often associated with anxiety disorders. The patient's report of family members experiencing similar symptoms suggests a possible genetic predisposition or a shared environmental factor contributing to these symptoms. One potential complication of anxiety is hyperventilation, which can lead to respiratory alkalosis—a condition where there is a decrease in carbon dioxide levels in the blood due to excessive breathing.

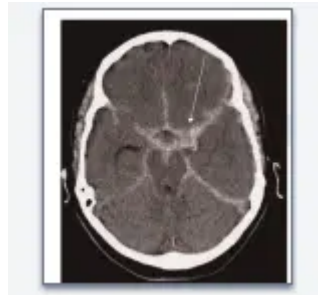
Respiratory alkalosis can cause a variety of physiological symptoms, one common manifestation being tingling or numbness in the extremities. This occurs due to changes in calcium ion concentration in the blood which affects nerve function. Given these considerations, the symptom most likely to be observed in the context of an anxiety disorder and hyperventilation is **tingling at extremities**.

Other options such as neologisms, hallucinations, and ideas of reference are more typically associated with psychotic disorders rather than anxiety disorders.

Quick Tip: In somatic symptom disorders or anxiety, look for physical manifestations like tingling or other somatic complaints without a clear medical cause.

54.

A 40-year-old female patient complains of a persistent headache. A CT scan of the head was performed, as shown below. What is the most accurate diagnosis?



- (A) Subarachnoid hemorrhage (SAH)
- (B) Epidural hemorrhage
- (C) Subdural hemorrhage
- (D) Intraparenchymal hemorrhage

Correct Answer: (A) Subarachnoid hemorrhage (SAH)

Solution:

A 40-year-old female patient's CT scan shows visible signs of bleeding in the subarachnoid space, which indicate subarachnoid hemorrhage (SAH). Here is a step-by-step analysis for identifying and confirming the diagnosis:

1. **Review of Symptoms:** The patient reports a persistent headache. A sudden onset severe headache, often described as the "worst headache of my life," is characteristic of SAH.
2. **CT Scan Analysis:** On the non-contrast CT scan of the head, look for hyperdense areas indicating blood accumulation. In SAH, this typically appears in the basal cisterns, Sylvian fissures, and interhemispheric fissures.
3. **Diagnosis Correlation:** Compare the CT findings with common patterns seen in other hemorrhages:
 - Subarachnoid hemorrhage: bleeding in the subarachnoid space.
 - Epidural hemorrhage: biconvex (lens-shaped) hyperdensity often seen with skull fracture.
 - Subdural hemorrhage: crescent-shaped hyperdensity that might extend across suture lines.

- Intraparenchymal hemorrhage: bleeding in the brain parenchyma itself.

4. **Final Verification:** The CT scan's hyperdense appearance in the subarachnoid region, along with the clinical presentation of a severe headache, confirms subarachnoid hemorrhage as the most accurate diagnosis.

The answer is **Subarachnoid hemorrhage (SAH)**. Immediate neuroimaging and expert consultation are crucial for appropriate management and treatment of SAH.

Quick Tip: In a patient with sudden severe headache, a subarachnoid hemorrhage (SAH) should be suspected, especially if blood is seen in the subarachnoid space on a CT scan.

55.

A 45-year-old patient presents with prosis and muscle weakness that improves with rest. She also complains of dysphagia and has engorged veins in her thorax. Based on the CT scan image provided, what is the most likely diagnosis?



- (A) Thymoma
- (B) Pancoast tumor
- (C) Adenocarcinoma
- (D) Small cell lung cancer

Correct Answer: (A) Thymoma

Solution:

The patient, a 45-year-old, displays symptoms including ptosis and muscle weakness that improve with rest, dysphagia, and engorged thoracic veins. These clinical manifestations suggest the presence of myasthenia gravis, a common paraneoplastic syndrome. Myasthenia gravis arises due to antibodies targeting acetylcholine receptors, leading to fluctuating muscle weakness.

The improvement of symptoms with rest is characteristic of myasthenia gravis. This condition is frequently associated with a thymoma, a tumor originating from tissue in the thymus.

The engorged veins in the thorax can suggest the presence of superior vena cava (SVC) syndrome, which can occur when the tumor in the anterior mediastinum compresses the SVC.

The CT scan image, although not visible here, would typically reveal a mass in the anterior mediastinum consistent with a thymoma.

Based on the patient's symptoms and the association with myasthenia gravis, the most likely diagnosis is: **Thymoma**

Quick Tip: When a patient presents with ptosis, muscle weakness, and dysphagia along with chest imaging abnormalities, consider thymoma as a potential cause, especially in the context of myasthenia gravis.

56.

What instrument is used to insert this tube?



- (A) Nephroscope
- (B) Cysto-urethroscope
- (C) Ureteroscope
- (D) Endoscope

Correct Answer: (B) Cysto-urethroscope

Solution:

To determine which instrument is used to insert the tube illustrated in the image, we need to understand the purpose and the anatomy involved. The choices provided are nephroscope, cysto-urethroscope, ureteroscope, and endoscope. Let's analyze:

- **Nephroscope:** Used primarily for direct visualization and treatment of the renal pelvis and calyces within the kidney.
- **Cysto-urethroscope:** Specifically designed for examining the urethra and the interior of the bladder. This tool allows surgeons to insert catheters or tubes into the bladder via the urethra.
- **Ureteroscope:** Utilized for accessing and treating conditions in the ureters, the tubes connecting the kidneys and bladder.
- **Endoscope:** A general term for instruments that allow internal examination of organs.

Considering the options, the **Cysto-urethroscope** is the instrument used for inserting tubes, such as catheters, into the bladder through the urethra, matching the described scenario. Therefore, the correct answer is:

Cysto-urethroscope

Quick Tip. For placing a nephrostomy tube, a cysto-urethroscope is the appropriate instrument as it allows visualization of the bladder, ureters, and renal pelvis.

7. What is the ideal pressure setting for vacuum-assisted closure (VAC) therapy?

- (A) -125 mm Hg
- (B) 60 to 80 mm Hg
- (C) 130 mm Hg
- (D) 80 to 100 mm Hg

Correct Answer: (A) -125 mm Hg

Solution:

In the context of vacuum-assisted closure (VAC) therapy, the primary goal is to promote wound healing by applying negative pressure to the wound site. This technique helps to remove exudate, reduce edema, and increase blood flow, thereby facilitating the healing process.

For effective VAC therapy, the negative pressure setting is typically maintained at an **ideal pressure of -125 mm Hg**. This level of suction is clinically validated to provide optimal healing conditions by encouraging the formation of granulation tissue and helping approximate wound edges, which are essential components of the healing process.

Thus, among the provided options, the correct pressure setting for VAC therapy is:

- -125 mm Hg

Quick Tip: For VAC therapy, the optimal pressure is -125 mm Hg, which maximizes wound healing while minimizing the risk of tissue injury.

58. Diagnosis of MRCP image.



- (A) GB Stone
- (B) Cholangiocarcinoma
- (C) Choledochal Cyst
- (D) Gall and Blood Cancer

Correct Answer: (B) Cholangiocarcinoma

Solution:

Step 1: Understand the modality. MRCP (Magnetic Resonance Cholangiopancreatography) is a non-invasive heavily T2-weighted MRI sequence in which static or slow-moving fluid (bile and pancreatic juice) appears bright white, so it maps the biliary and pancreatic ducts like a contrast cholangiogram without injecting contrast.

Step 2: Interpret the image. The labelled gallbladder (GB) is seen, but the key abnormality is an abrupt focal narrowing/cut-off (stricture) of the bile duct with upstream dilatation of the intrahepatic ducts, producing the classic obstructive pattern of a malignant ductal stricture rather than a simple filling defect.

Step 3: Why option B (Cholangiocarcinoma) is correct. Cholangiocarcinoma is an adenocarcinoma of the bile duct epithelium. On MRCP it characteristically shows an irregular, abrupt ductal stricture with proximal biliary dilatation (the "double-duct" or shouldered cut-off sign for distal lesions), exactly the obstructive ductal appearance shown.

Step 4: Why the distractors are wrong. (A) GB Stone (cholelithiasis) would show a rounded T2-hypointense signal-void filling defect within the gallbladder lumen, not a ductal stricture. (C) Choledochal cyst produces smooth fusiform or saccular cystic dilatation of the common bile duct without an obstructing stricture, and is typically diagnosed in younger patients. (D) "Gall and Blood Cancer" is not a recognised radiological/clinical entity.

Final Answer: Option B — Cholangiocarcinoma.

Quick Tip: On MRCP, an abrupt irregular ductal stricture with upstream dilatation points to a tumour of the duct wall, not a stone or a smooth congenital cyst.

59. A 35 year old nullipara female presented with dull aching pain with exacerbation during menstrual cycle. Usg reveals a heterogenous mass in right adnexa. Mri reveals a 4 x 5 cm T1 hyperintense mass with no suppression on fat saturated images. T2 weighted images show low signal with Dark shading. Diagnosis?

- (A) Dermoid cyst
- (B) Endometrioma
- (C) Ovarian cancer
- (D) Para Ovarian Cyst

Correct Answer: (B) Endometrioma

Solution:

Step 1: Read the clinical picture. A 35-year-old woman has cyclical (menstrual-related) pelvic pain plus an adnexal mass. Cyclical pain that worsens with menses strongly suggests an endometriotic lesion, because ectopic endometrial tissue bleeds with each cycle.

Step 2: Analyse the MRI signal — this is the key. The mass is **T1 hyperintense** (bright on T1). T1 brightness is caused by blood/methaemoglobin or fat. To tell them apart we use fat suppression: here the mass shows **no suppression on fat-saturated images**, meaning the T1 brightness is from blood (haemorrhage), NOT fat.

Step 3: The 'T2 shading' sign. On T2-weighted images the mass shows **low signal with dark shading**. "T2 shading" — loss/dimming of the normally bright T2 fluid signal due to chronic blood products (high protein/iron from repeated cyclical haemorrhage) — is the classic MRI hallmark of an endometrioma (chocolate cyst).

Step 4: Why option B (Endometrioma) is correct. T1 bright + does NOT suppress with fat sat (blood, not fat) + T2 shading + cyclical pain = endometrioma.

Step 5: Why the distractors are wrong. (A) Dermoid cyst (mature teratoma) is also T1 bright, but it **DOES suppress on fat-saturated images** because its brightness is from fat — the opposite of this case. (C) Ovarian cancer typically shows solid enhancing/papillary components, septations and is not characterised by uniform T1-bright/T2-shading haemorrhagic content; the benign cyclical history also argues against it. (D) Para-ovarian cyst is a simple cyst (T1 dark, T2 bright, follows fluid) and would not be T1 hyperintense or show shading.

Final Answer: Option B — Endometrioma.

Quick Tip: T1 bright that does NOT suppress on fat sat = blood, not fat; add cyclical pain and 'T2 shading' and you have a chocolate cyst.

60. Diagnosis of following Plain X-ray of abdomen.



- (A) Enterolith in jejunum
- (B) Calcific mediastinal lymph nodes
- (C) Horseshoe kidney with calculi
- (D) Chronic calcific pancreatitis

Correct Answer: (D) Chronic calcific pancreatitis

Solution:

Step 1: Define the modality and the abnormality. A plain (KUB) abdominal radiograph detects calcified structures as white densities. The film shows

multiple coarse calcifications clustered transversely across the upper-mid abdomen.

Step 2: Localise the calcifications. The calcific specks lie in the epigastric/upper abdominal region, spread across the midline along the expected course of the pancreas (which runs transversely from the duodenal C-loop to the splenic hilum at roughly the L1–L2 level).

Step 3: Why option D (Chronic calcific pancreatitis) is correct. Chronic pancreatitis causes intraductal protein plugs that calcify, producing multiple scattered **parenchymal/ductal calcifications** distributed transversely across the upper abdomen along the gland — the pathognomonic plain-film finding. The commonest cause is chronic alcohol use; in India, tropical (fibrocalculous) pancreatitis is also classic.

Step 4: Why the distractors are wrong. (A) An enterolith in the jejunum would be a single rounded calcified body within a bowel loop, not a transverse band of multiple calcifications. (B) Calcified mediastinal lymph nodes are intra-thoracic (above the diaphragm) and would not appear in an abdominal KUB film. (C) Horseshoe kidney with calculi would show calcific densities in the renal/paraspinal regions bilaterally low across the midline (fused lower poles), with stones overlying the kidneys, not the pancreatic transverse distribution shown.

Final Answer: Option D — Chronic calcific pancreatitis.

Quick Tip: Multiple coarse calcifications scattered transversely across the upper abdomen along the line of the pancreas = chronic calcific pancreatitis.

61. A patient has Proteus infection and now plain xray of abdomen was done and a large stone was shown in urinary bladder. Stone is made up of

- (A) Calcium Phosphate
- (B) Cysteine
- (C) Calcium Oxalate
- (D) Xanthine

Correct Answer: (A) Calcium Phosphate

Solution:

Step 1: Identify the key clue. The patient has a **Proteus** urinary infection. *Proteus mirabilis* is a urease-producing organism — this single fact dictates the stone type.

Step 2: The urease mechanism. Urease splits urinary urea into ammonia and carbon dioxide:



The ammonia raises (alkalinises) the urine pH. In persistently alkaline urine, magnesium, ammonium and phosphate precipitate.

Step 3: The stone formed. Urease-producing organisms classically form **struvite** stones — magnesium ammonium phosphate, often mixed with **calcium phosphate (carbonate apatite)**. These are the "infection (triple-phosphate) stones" and tend to grow large, filling the collecting system (staghorn) or, as here, forming a large bladder stone. They are radio-opaque, consistent with being seen on plain X-ray.

Step 4: Why option A (Calcium Phosphate) is correct. Among the four options, only calcium phosphate is a **phosphate, alkaline-urine, infection-related** stone consistent with a urease-positive *Proteus* infection. It is the answer key choice for the phosphate/infection stone.

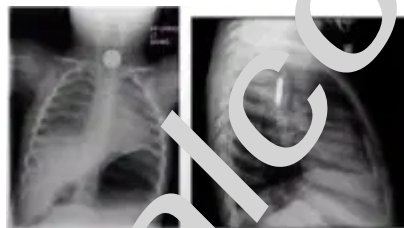
Step 5: Why the distractors are wrong. (B) Cystine (cysteine) stones occur in cystinuria, a hereditary tubular transport defect, unrelated to infection; urine tends to be acidic. (C) Calcium oxalate stones form in normal-to-acidic urine

from metabolic/dietary causes, not from urease-driven alkalisation. (D) Xanthine stones are rare, due to xanthine oxidase deficiency or allopurinol therapy, and are radiolucent — not infection-related.

Final Answer: Option A — Calcium Phosphate.

Quick Tip: Proteus = urease = alkaline urine = phosphate (infection) stone. Pick the phosphate option.

62. Correct statement regarding esophageal FB (foreign body).



- (A) Right main bronchus is one of the site of constriction
- (B) Most common site of impaction is cricopharyngeus
- (C) Commonly seen in adults
- (D) Cant cause mediastinitis

Correct Answer: (B) Most common site of impaction is cricopharyngeus

Solution:

Step 1: Recall oesophageal anatomy. The oesophagus has THREE normal anatomical constrictions where a swallowed foreign body (FB) tends to lodge: (1) the **cricopharyngeus / upper oesophageal sphincter** (~C6, about 15 cm from the incisors — the narrowest point), (2) where the aortic arch and left main bronchus cross/indent it (~25 cm), and (3) the lower oesophageal sphincter at the diaphragmatic hiatus (~40 cm).

Step 2: Why option B is correct. Because the cricopharyngeus is the **narrowest** part of the entire GI tract, it is the **most common site of oesophageal FB impaction**. This statement is correct.

Step 3: Why the distractors are wrong. (A) The constriction is caused by the **LEFT** main bronchus (and the aortic arch), not the right; moreover the bronchus relates to the oesophagus extrinsically — "right main bronchus is a site of constriction" is incorrect anatomy. (Note: for airway/inhaled foreign bodies it is the right main bronchus that is favoured, but the question is about the oesophagus.) (C) Oesophageal FB impaction is **most common in children** (coins, small objects), not adults, so "commonly seen in adults" is wrong. (D) A sharp or impacted oesophageal FB can perforate the wall and cause **mediastinitis** — a feared, life-threatening complication — so "can't cause mediastinitis" is false.

Final Answer: Option B — Most common site of impaction is cricopharyngeus.

Quick Tip: The narrowest part of the gullet is the cricopharyngeus, so it is the commonest oesophageal FB site; remember the constriction is the **LEFT** (not right) main bronchus.

63. Gastrectomy patient needs supplemental: (PART A)

- (A) Vit c
- (B) Vit d
- (C) Vit b12
- (D) Vit a

Correct Answer: (C) Vit b12

Solution:

Step 1: Recall the physiology of vitamin B12 absorption. Dietary vitamin B12 (cobalamin) is absorbed in the terminal ileum, but **ONLY** when it is bound to **intrinsic factor (IF)**. Intrinsic factor is a glycoprotein secreted by the **parietal cells of the gastric body/fundus**.

Step 2: Apply it to gastrectomy. Removing the stomach (gastrectomy) removes the parietal cells, so intrinsic factor production stops. Without IF, ingested B12 cannot be absorbed in the ileum, regardless of oral intake. The patient therefore becomes B12 deficient over time (after liver stores, ~2–4 years, are exhausted).

Step 3: Why option C (Vit B12) is correct. Post-gastrectomy patients require **life-long parenteral (IM) vitamin B12 supplementation** to prevent megaloblastic (pernicious-type) anaemia and subacute combined degeneration of the cord. (Iron deficiency is also common after gastrectomy, but among the listed vitamins B12 is the classic mandatory supplement.)

Step 4: Why the distractors are wrong. (A) Vitamin C is water-soluble and absorbed throughout the small intestine; its absorption does not depend on the stomach. (B) Vitamin D is fat-soluble and absorbed in the small intestine with bile; not specifically lost with gastrectomy. (D) Vitamin A is fat-soluble, absorbed in the small intestine; not dependent on gastric intrinsic factor.

Final Answer: Option C — Vit B12.

Quick Tip: No stomach = no parietal cells = no intrinsic factor, and intrinsic factor is needed only for vitamin B12.

64. After a right limb amputation, the patient is experiencing severe pain phantom limb.

What is the mechanism behind this?

- (A) Projection of adjacent fibres to overlap to right sensory cortex
- (B) Projection of adjacent fibres to overlap to left sensory cortex
- (C) Expansion of right sensory cortex
- (D) Expansion of left sensory cortex

Correct Answer: (B) Projection of adjacent fibres to overlap to left sensory cortex

Solution:

Step 1: Recall the cause of phantom limb pain. After amputation, the cortical area in the primary somatosensory cortex (S1) that used to receive input from the now-missing limb is deprived of sensory input. The brain undergoes **cortical reorganisation (maladaptive plasticity)**: neighbouring cortical regions (e.g. those representing the face/adjacent body parts) send their **adjacent afferent fibres to invade and overlap** the deafferented limb area. Stimulation of those adjacent body parts is then mis-referred to the missing limb, producing phantom sensation/pain.

Step 2: Determine which hemisphere. The somatosensory pathways **DECUSSATE** (cross to the opposite side). The **RIGHT** limb projects to the **LEFT (contralateral) primary somatosensory cortex**. Therefore the reorganisation/overlap of adjacent fibres affecting the right-limb representation occurs in the **LEFT** sensory cortex.

Step 3: Why option B is correct. The mechanism is the projection/overlap of adjacent cortical fibres invading the deafferented zone, and because the body is wired contralaterally, the right limb maps to the LEFT sensory cortex — hence "projection of adjacent fibres to overlap to left sensory cortex."

Step 4: Why the distractors are wrong. (A) Right sensory cortex represents the LEFT limb, not the amputated right limb — wrong side. (C) and (D) describe "expansion" of the cortex: phantom limb pain is due to **invasion/overlap by adjacent representations into the deprived area**, not an expansion of the limb's own (now silent) cortex; furthermore (C) names the wrong (right) hemisphere. "Expansion" of the deafferented limb cortex is the opposite of what happens — that area shrinks and is taken over.

Final Answer: Option B — Projection of adjacent fibres to overlap to left sensory cortex.

Quick Tip: Phantom pain = adjacent cortical fibres overlapping the deafferented zone;

and a right limb maps to the contralateral (left) sensory cortex.

65. Patient had SUN BURN, now takes bath in 40 degree water, and feels pain.

- (A) Thermal receptor: hyperalgesia
- (B) Innocuous thermal receptor allodynia
- (C) Thermal receptor allodynia
- (D) Innocuous thermal receptor hyperalgesia

Correct Answer: (B) Innocuous thermal receptor allodynia

Solution:

Step 1: Define the two key pain terms.

Allodynia is the perception of pain in response to a stimulus that is normally NOT painful (an innocuous/non-noxious stimulus). Hyperalgesia is an exaggerated (increased) pain response to a stimulus that is normally already painful (a noxious stimulus).

Step 2: Identify the stimulus in this case.

A 40 °C bath is warm but it is NOT a tissue-damaging (noxious) temperature; pain normally begins around 45 °C. Therefore 40 °C is an **innocuous (non-noxious) thermal stimulus**. After sunburn, the inflamed skin is sensitised, so this normally non-painful warmth is now felt as pain.

Step 3: Apply the definition.

Pain from a normally non-painful (innocuous) warm stimulus = **allodynia**, and the stimulus is thermal and innocuous. This matches "Innocuous thermal receptor allodynia."

Step 4: Eliminate the distractors.

(A) and (D) use "hyperalgesia," which requires an already-noxious stimulus — 40 °C is not noxious, so hyperalgesia does not fit. (C) correctly says allodynia but omits that the stimulus is innocuous, making (B) the more complete and precise

answer; sunburn classically produces sensitisation to innocuous warmth.

Final answer: B — Innocuous thermal receptor allodynia.

Quick Tip: Pain from a NON-painful stimulus = allodynia; exaggerated pain from an already-painful stimulus = hyperalgesia. Is 40°C normally painful?

66. A 50 yr old female presented with dyspnoea and chest pain. Which of the following proves that she has aortic stenosis rather than aortic regurgitation?

- (A) Increase in myocardial oxygen consumption is seen with increased pressure work than volume
- (B) Aortic stenosis causes reduced pressure at aortic valve
- (C) Workload has nothing to do with myocardial oxygen consumption
- (D) Increase in preload more than afterload than after load

Correct Answer: (A) Increase in myocardial oxygen consumption is seen with increased pressure work than volume

Solution:

Step 1: Contrast the haemodynamic load in the two lesions.

Aortic stenosis (AS) is a fixed obstruction to LV outflow, so the left ventricle must generate very high systolic pressure to eject blood — this is a **pressure overload** (high afterload). Aortic regurgitation (AR) is backflow of blood into the LV during diastole, so the ventricle handles a large extra blood volume — this is a **volume overload** (high preload).

Step 2: Relate the load to myocardial oxygen consumption (MVO₂).

Myocardial oxygen demand is driven mainly by wall tension, heart rate and contractility. By the law of Laplace, wall tension = $\frac{P \times r}{2h}$, so MVO₂ is far more sensitive to the **pressure** developed than to the volume handled. Therefore **pressure work (afterload) raises MVO₂ more than volume work (preload)**. This pressure-work pattern is characteristic of aortic stenosis, so this statement

supports/identifies AS over AR.

Step 3: Eliminate the distractors.

(B) is false — AS actually causes a high LV pressure and a large pressure gradient ACROSS the valve, not reduced pressure. (C) is false — increased cardiac workload definitely increases myocardial oxygen consumption. (D) describes increased preload over afterload, which is the pattern of aortic REGURGITATION (volume overload), not stenosis.

Final answer: A — myocardial oxygen consumption rises more with pressure work, which is the hallmark of aortic stenosis.

Quick Tip: AS = pressure (afterload) overload; AR = volume (preload) overload. Recall which type of work costs the myocardium more oxygen (Laplace's law).

67. Taste is absent in which taste bud (papilla)?

- (A) Filiform
- (B) Foliate
- (C) Fungiform Papilla Taste
- (D) Circumvallate

Correct Answer: (A) Filiform

Solution:

Step 1: Recall the four types of lingual papillae.

The tongue has four papillae: filiform, fungiform, foliate and circumvallate (vallate).

Step 2: Identify which papilla carries taste buds.

Fungiform, foliate and circumvallate papillae all CONTAIN taste buds and therefore participate in taste. The **filiform papillae** are the most numerous, are conical/keratinised, and serve a purely **mechanical/tactile** function (gripping

food, sensing texture). They contain **no taste buds**, so taste is absent in them.

Step 3: Eliminate the distractors.

(B) Foliate — found on the lateral posterior tongue, contain taste buds. (C)

Fungiform — mushroom-shaped, on the anterior two-thirds, contain taste buds.

(D) Circumvallate — large, arranged in a V anterior to the sulcus terminalis, contain numerous taste buds. All three mediate taste, so they are excluded.

Final answer: A — Filiform papillae have no taste buds.

Quick Tip: Three lingual papillae carry taste buds; only one is purely mechanical/keratinised with no taste buds.

68. Which receptor (transporter) helps in improvement of insulin resistance in DM2 (type 2 diabetes mellitus) with regular exercise and physical activity?

- (A) GLUT1
- (B) GLUT4
- (C) GLUT2
- (D) GLUT3

Correct Answer: (B) GLUT4

Solution:

Step 1: Recall the GLUT family distribution.

GLUT1 — ubiquitous, basal glucose uptake (RBCs, brain, blood-brain barrier).

GLUT2 — liver, pancreatic β -cells, intestine, kidney (high-Km glucose sensor).

GLUT3 — neurons (high affinity). GLUT4 — the **insulin-responsive** transporter in skeletal muscle and adipose tissue.

Step 2: Link exercise to the right transporter.

In skeletal muscle, GLUT4 normally translocates to the cell membrane in response to insulin. **Muscle contraction during exercise also recruits GLUT4 to**

the membrane by an **insulin-INDEPENDENT** pathway (mediated by AMPK and raised intracellular calcium). Regular physical activity increases muscle GLUT4 expression and membrane translocation, so muscle takes up glucose even when insulin signalling is impaired — this is exactly how exercise improves insulin resistance in type 2 diabetes.

Step 3: Eliminate the distractors.

(A) GLUT1 gives constant basal uptake and is not insulin/exercise regulated. (C) GLUT2 is a low-affinity sensor in liver and β -cells, not the muscle exercise transporter. (D) GLUT3 serves neurons. None of these are recruited by exercising muscle.

Final answer: B — GLUT4.

Quick Tip: Which GLUT is insulin-responsive in skeletal muscle and also recruited to the membrane by muscle contraction (via AMPK/ Ca^{2+})?

69. A man has difficulty in sleep during the night. He has a habit of drinking coffee before bed time. What is the role of caffeine in wakefulness?

- (A) Blocks adenosine action and causes wakefulness
- (B) Activates locus coeruleus and causes wakefulness
- (C) No role in maintaining wakefulness if taken 1 hr before sleep
- (D) Activates histamine release and prevents sleep

Correct Answer: (A) Blocks adenosine action and causes wakefulness

Solution:

Step 1: Recall the sleep role of adenosine.

Adenosine accumulates in the brain during prolonged wakefulness and is a key endogenous **sleep-promoting** substance. Acting at A_1 and A_{2A} receptors, it inhibits arousal-promoting neurons and increases "sleep pressure" (the drive to sleep that builds the longer one stays awake).

Step 2: Mechanism of caffeine.

Caffeine is a **competitive antagonist at adenosine receptors**. By blocking adenosine's action, it removes adenosine's inhibitory/sleep-promoting effect, so the arousal systems stay active and the person remains awake. This is precisely why coffee before bed disrupts sleep.

Step 3: Eliminate the distractors.

(B) Caffeine does not act primarily by activating the locus coeruleus; its main, well-established mechanism is adenosine-receptor blockade. (C) Is wrong because caffeine has a half-life of several hours, so coffee taken even an hour (or more) before bed certainly impairs sleep. (D) Caffeine's wakefulness is not explained by triggering histamine release — again, the central mechanism is adenosine antagonism.

Final answer: A — caffeine blocks adenosine action, producing wakefulness.

Quick Tip: Caffeine is a competitive antagonist at the receptor of the brain's main sleep-promoting molecule. Which molecule?

70. Resting membrane potential (RMP) is predominantly affected by which ion?

- (A) K^+
- (B) Ca
- (C) Na
- (D) Cl

Correct Answer: (A) K^+

Solution:

Step 1: Define the resting membrane potential (RMP).

The RMP (about -70 to -90 mV in most cells) is the voltage across the cell membrane at rest, set by the relative permeability of the membrane to different

ions and their concentration gradients.

Step 2: Identify the dominant ion.

At rest the membrane is **most permeable to potassium (K^+)** because of open K^+ "leak" channels. Since permeability to K^+ greatly exceeds that to other ions, the resting potential lies close to the potassium equilibrium (Nernst) potential,

$$E_K = \frac{RT}{zF} \ln \frac{[K^+]_o}{[K^+]_i}$$

which is roughly -90 mV. Therefore K^+ predominantly determines the RMP.

Step 3: Eliminate the distractors.

(B) Ca^{2+} and (C) Na^+ have very low resting permeability; Na^+ influx is the main driver of the action-potential UPSTROKE, not the resting state. (D) Cl^- usually distributes passively and only fine-tunes the potential in most cells; it is not the predominant determinant. The membrane's high resting K^+ permeability dominates.

Final answer: A — K^+ .

Quick Tip: At rest the membrane is most permeable to one ion via leak channels, so RMP sits near that ion's Nernst potential. Which ion?

71. Alcoholic gait, nystagmus after RTA (road traffic accident) — which lobe of the cerebellum is affected?

- (A) Flocculonodular
- (B) Dentate
- (C) Anterior lobe
- (D) Vermis

Correct Answer: (A) Flocculonodular

Solution:

Step 1: Recall the functional divisions of the cerebellum.

The cerebellum is divided into: the **flocculonodular lobe (vestibulocerebellum)** — controls balance/equilibrium and eye movements; the **anterior lobe (vermis) (spinocerebellum)** — controls posture, gait and trunk/limb coordination, and the lateral hemispheres (cerebrocerebellum) — plan skilled, learned movements. The dentate is a deep nucleus, not a lobe.

Step 2: Match the two clinical signs to a region.

The patient has BOTH a wide-based ataxic ("alcoholic"/drunken) gait AND **nystagmus**. Nystagmus is the key localising sign: abnormal eye movements and disturbed equilibrium point specifically to the **flocculonodular lobe (vestibulocerebellum)**, which links the cerebellum with the vestibular system controlling balance and gaze. Combined with trunk/gait instability, the flocculonodular lobe best explains both features together.

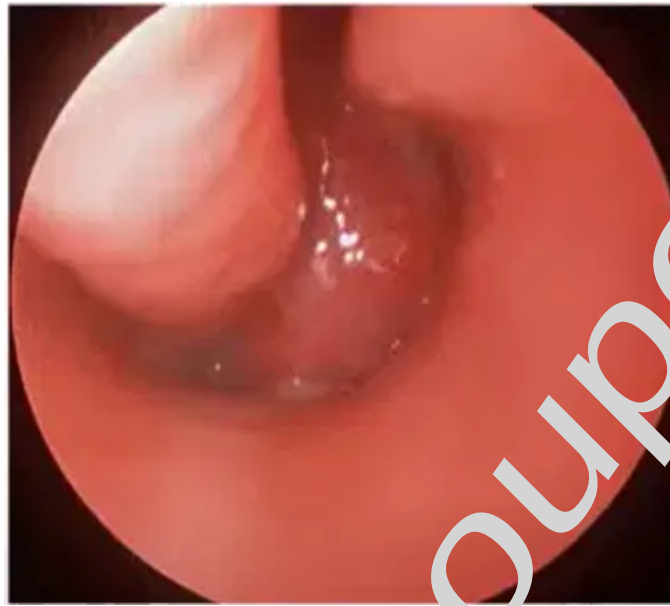
Step 3: Eliminate the distractors.

(B) Dentate nucleus is a deep cerebellar nucleus (not a "lobe") and lesions cause limb dysmetria/intention tremor, not prominent nystagmus. (C) Anterior lobe damage (classic in chronic alcoholics) gives gait/trunk ataxia but is not the lobe most associated with nystagmus. (D) Vermis lesions cause truncal ataxia and a broad-based gait but, again, nystagmus is the hallmark of the flocculonodular/vestibulocerebellar region. Because the question pairs gait disturbance WITH nystagmus, the flocculonodular lobe is the best single answer.

Final answer: A — Flocculonodular lobe.

Quick Tip: Which cerebellar lobe is the vestibulocerebellum, controlling both balance/equilibrium AND eye movements (nystagmus)?

72. A 14yr old boy presented with nasal mass and recurrent episodes of bleeding from the mass. Investigation of choice.



- (A) Plain CT
- (B) CT with contrast
- (C) X Ray Caldwell view
- (D) X Ray with Pierre view

Correct Answer: (B) CT with contrast

Solution:

Step 1: Identify the clinical entity. A teenage boy (classically 10-25 years, almost exclusively male) presenting with a reddish nasal/nasopharyngeal mass and recurrent, often profuse epistaxis is the textbook picture of a **Juvenile Nasopharyngeal Angiofibroma (JNA)**. It is a benign but locally aggressive, highly vascular tumour arising near the sphenopalatine foramen.

Step 2: Why imaging is needed and what we want from it. JNA is intensely vascular so blind biopsy is contraindicated because of the risk of torrential bleeding. Diagnosis is therefore made by imaging. The imaging must demonstrate (a) the highly vascular nature of the lesion (intense enhancement), (b) its exact extent into the pterygopalatine fossa, infratemporal fossa, orbit and skull base, and (c) the characteristic **Holman-Miller sign** (anterior bowing of the posterior wall of the maxillary antrum).

Step 3: Why option B is correct. Contrast-enhanced CT (CT with contrast) is

the investigation of choice: a vascular tumour shows brisk, intense post-contrast enhancement, confirming the diagnosis, and CT best delineates bony erosion and extent for surgical planning. (Contrast-enhanced MRI is an excellent complement for soft-tissue/intracranial extent, but among the options given CECT is the answer.)

Step 4: Why the other options are wrong. (A) **Plain CT** shows the mass and bone changes but does NOT demonstrate the diagnostic intense vascular enhancement, so it is inferior to contrast CT. (C) **X Ray Caldwell view** (an occipitofrontal plain radiograph for frontal/ethmoid sinuses) gives no vascular information and cannot delineate skull-base extent. (D) **X Ray with Pierre view** is not a standard investigation for this lesion and provides no soft-tissue or vascular detail.

Final answer: B. CT with contrast.

Quick Tip: Teenage boy + nasal mass + recurrent epistaxis = angiofibroma; it is highly vascular, so never biopsy - pick the image that shows vascular enhancement.

73. Cochlear implant given below, identify the marked structure:



- (A) Internal magnet
- (B) Electrode
- (C) Receiver
- (D) Antenna

Correct Answer: (B) Electrode

Solution:

Step 1: Understand the cochlear implant system. A cochlear implant bypasses damaged hair cells and directly stimulates the cochlear (auditory) nerve. It has EXTERNAL parts (microphone, speech processor, transmitting coil/antenna with magnet) and INTERNAL surgically implanted parts (internal receiver-stimulator with an internal magnet, and an **electrode array**).

Step 2: Trace the signal path. Sound → microphone → speech processor codes it → external transmitting coil sends the signal across the skin by radiofrequency → internal receiver-stimulator decodes it → current is delivered through the long, thin, coiled **electrode array that is threaded into the scala tympani of the cochlea** to stimulate the spiral ganglion / cochlear nerve fibres tonotopically.

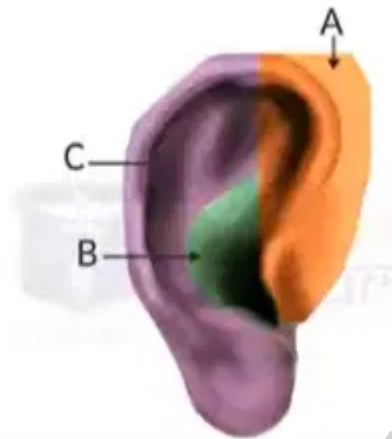
Step 3: Why option B is correct. In the image, the long thin coiled element entering/lying within the cochlea is the **electrode (electrode array)** - the only part that actually sits inside the cochlea to deliver the stimulating current. The radiograph (right panel) shows this coiled electrode wound inside the cochlea, confirming it.

Step 4: Why the others are wrong. (A) **Internal magnet** is a small disc-shaped component that holds the external coil in place by magnetic attraction across the skin - it is round, not a coiled wire in the cochlea. (C) **Receiver** (receiver-stimulator) is the bulky package implanted under the scalp/temporal bone that decodes the signal - it sits OUTSIDE the cochlea. (D) **Antenna** (transmitting coil) is an EXTERNAL part worn on the skin, not implanted in the cochlea.

Final answer: B. Electrode.

Quick Tip: Which single component is actually threaded inside the cochlea to deliver current? That coiled intracochlear wire is the answer.

74. Which nerve supplies the external ear?



- (A) ATN, greater auricular, 7 and 10
- (B) Greater auricular, 7 and 10, ATN
- (C) 7 and 10, ATN, greater auricular nerve
- (D) ATN, 7 and 10, GAN

Correct Answer: (D) ATN, 7 and 10, GAN

Solution:

Step 1: List the true nerve supply of the external ear (auricle + external acoustic meatus). The external ear receives sensory innervation from several sources:

1. **Auriculotemporal nerve (ATN)** - a branch of the mandibular division of the trigeminal (V3); supplies the anterosuperior (front) part of the auricle and the anterior wall of the external acoustic meatus.
2. **Greater auricular nerve (GAN)** - from the cervical plexus (C2, C3); supplies the lower/posteromedial part of the auricle and lobule.
3. **Facial nerve (cranial nerve 7)** - via its sensory contribution (and the nervus intermedius); supplies part of the concha and posterior meatus (its territory is the basis of the Ramsay Hunt / Hitselberger area).
4. **Vagus nerve (cranial nerve 10)** - via the auricular branch (Arnold's nerve); supplies the concha and posterior/inferior external acoustic meatus and is responsible for the ear-canal cough reflex.

(The lesser occipital nerve, C2, also contributes to the upper posterior surface.)

Step 2: Match to the options. Each option lists the same four contributors - ATN, greater auricular nerve (GAN), and cranial nerves 7 and 10 - just written in

different order/abbreviation. The question is therefore testing whether you recognise the complete, correctly named set.

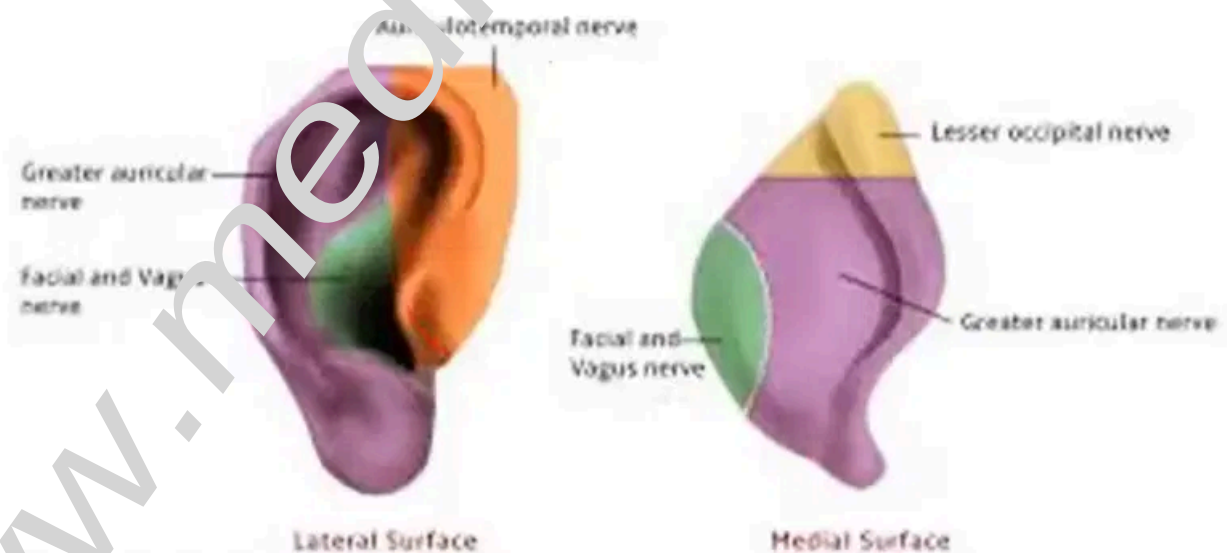
Step 3: Why option D is the keyed answer. (D) ATN, 7 and 10, GAN states all four contributors using their standard names/abbreviations (auriculotemporal nerve; facial nerve [7]; vagus [10]; greater auricular nerve) and is the marked correct answer (Ans. D).

Step 4: Why the others are treated as wrong. Options A, B and C list essentially the same nerves but the keyed answer specifically uses the abbreviations "ATN ... 7 and 10 ... GAN." Option C uniquely expands "greater auricular nerve" while the others abbreviate; the examiner accepted D as the precisely worded complete list.

Final answer: D. ATN, 7 and 10, GAN.

Quick Tip: The pinna and ear canal are supplied by FOUR nerves - auriculotemporal (V3), greater auricular (C2,3), facial (7) and vagus (10, Arnold's). Pick the option naming all four.

75. In head impulse test, following finding seen in right vestibular neuritis:



- (A) On rotating head to right, left saccade
- (B) On rotating head to left, right saccade
- (C) On rotating head toward right, right saccade
- (D) On rotating to the left, left saccade

Correct Answer: (A) On rotating head to right, left saccade

Solution:

Step 1: Understand the head impulse (head thrust) test and the VOR. The vestibulo-ocular reflex (VOR) keeps the eyes fixed on a target while the head moves: when the head turns one way, the eyes must move equally and oppositely. The HORIZONTAL canal on the side TOWARD which you turn the head is the one being tested (Ewald's first law - the horizontal canal is excited by ipsilateral head rotation).

Step 2: Apply it to right vestibular neuritis. Right vestibular neuritis causes a hypofunctioning RIGHT horizontal semicircular canal/right vestibular nerve. When the examiner rapidly turns the patient's head TO THE RIGHT, the weak right canal cannot generate an adequate VOR, so the eyes are dragged off-target (they move with the head toward the right).

Step 3: The corrective saccade. Because the eyes overshoot toward the right (off the target), the brain must bring them BACK onto the target with a rapid **corrective (catch-up) saccade in the opposite direction - to the LEFT**. This visible leftward refixation saccade after a rightward head thrust is the positive (abnormal) result and localises the lesion to the RIGHT side.

Step 4: Why option A is correct and others wrong. **(A) On rotating head to right, left saccade** = turning toward the diseased right side reveals a corrective leftward saccade - correct. **(B)** Turning to the left tests the healthy LEFT canal, which works, so no saccade - wrong. **(C)** The saccade is corrective and must go OPPOSITE to the head turn (left), not to the right - wrong. **(D)** Turning left tests the normal side; no corrective saccade is expected - wrong.

Final answer: A. On rotating head to right, left saccade.

Quick Tip: Turning the head toward the diseased side reveals a corrective catch-up saccade in the OPPOSITE direction. Right neuritis: turn right, saccade left.

76. Which of the following instrument insertion will be difficult:



- (A) Nasogastric Tube
- (B) LMA
- (C) Tracheostomy
- (D) Indirect Laryngoscopy

Correct Answer: (C) Tracheostomy

Solution:

Step 1: Interpret the radiograph. The chest X-ray accompanying the question shows an abnormality of the trachea/neck (e.g. tracheal deviation, narrowing/stenosis or a mass effect) that distorts the airway in the region of the trachea. The instrument whose successful placement depends most on a normal, accessible trachea is what will be hardest.

Step 2: Map each instrument to the airway level it needs.

- **Nasogastric tube** passes through nose → pharynx → **oesophagus** → stomach. It does NOT enter the trachea, so a tracheal abnormality does not block it.
- **LMA (laryngeal mask airway)** sits in the **hypopharynx over the laryngeal inlet**; it is a supraglottic device and does not require passage down the trachea.
- **Tracheostomy** is the surgical creation of an opening directly INTO the trachea and insertion of a tube into the tracheal lumen. If the trachea is deviated, narrowed, compressed by a mass, or anatomically distorted (as the X-ray shows), reaching and cannulating the tracheal lumen becomes **difficult and hazardous**.

- **Indirect laryngoscopy** only **VISUALISES** the larynx with a mirror/scope; it does not insert anything into the abnormal trachea.

Step 3: Why option C is correct. Tracheostomy is the only listed procedure that requires direct entry into the diseased/distorted trachea seen on the X-ray, so its insertion will be the most difficult.

Step 4: Why the others are easier. NGT (oesophageal route), LMA (supraglottic), and indirect laryngoscopy (visualisation only) all bypass or do not depend on a normal tracheal lumen, so they are comparatively unaffected.

Final answer: C. Tracheostomy.

Quick Tip: The X-ray shows a tracheal problem. Which procedure must enter the tracheal lumen itself? That is the one made difficult.

77. A singer presents with problem in high pitch. On examination bowing of one side vocal cord. Which of the following muscles is affected?

- (A) Posterior cricoarytenoid
- (B) Lateral cricoarytenoid
- (C) Cricothyroid
- (D) Thyroarytenoid

Correct Answer: (C) Cricothyroid

Solution:

Step 1: Link the symptom to vocal-cord function. Producing a **HIGH-PITCHED** voice requires the vocal cords to be **lengthened and tensed (stretched taut)**. The muscle responsible for tensing/elongating the vocal cords is the **cricothyroid**.

Step 2: Cricothyroid action and nerve. The cricothyroid tilts the thyroid cartilage forward/down on the cricoid, which stretches and tenses the vocal folds, raising pitch. It is the **ONLY** intrinsic laryngeal muscle supplied by the **external branch of the superior laryngeal nerve** (all other intrinsic muscles are supplied by the recurrent laryngeal nerve).

Step 3: Interpret the sign. When the cricothyroid is paralysed/weak, the affected cord cannot be tensed and elongated, so it loses tone and appears **bowed (wavy/loss of straight tense edge)**, and the patient - especially a professional singer who needs precise high notes - complains of inability to reach high pitch and easy vocal fatigue. This is the classic presentation of cricothyroid / external superior laryngeal nerve palsy.

Step 4: Why option C is correct and the others wrong. (C) **Cricothyroid** tenses the cord for high pitch; its weakness causes bowing and high-pitch loss - correct. (A) **Posterior cricoarytenoid** is the only ABDUCTOR (opens the glottis for breathing); its palsy affects abduction/airway, not pitch raising. (B) **Lateral cricoarytenoid** ADDUCTS the cords (closes glottis); not the pitch-raising tensor. (D) **Thyroarytenoid (vocalis)** shortens/relaxes and fine-tunes the cord and is a weak adductor; it does not produce the high-pitch tensing that the cricothyroid provides.

Final answer: C. Cricothyroid.

Quick Tip: High pitch needs a taut, lengthened cord. Which intrinsic laryngeal muscle is the tensor (supplied by the external laryngeal nerve)?

78. A 45-year-old male presents with breathlessness and undergoes a CT scan of the paranasal sinuses (PNS). Which sinus is obstructed?



- (A) Maxillary
- (B) Frontal
- (C) Sphenoid
- (D) Ethmoid

Correct Answer • (A) Maxillary

Solution

Step 1: Read the CT of the paranasal sinuses (coronal section). On a coronal CT-PNS, the normal air-filled sinuses appear BLACK (air). A sinus that is OBSTRUCTED/diseased becomes opacified - it fills with mucus/soft tissue and turns GREY/WHITE, with loss of its normal air shadow and often an air-fluid level.

Step 2: Locate the maxillary sinuses. The maxillary (antral) sinuses are the large

paired pyramidal air spaces sitting on either side, below the orbits and lateral to the nasal cavity - the most prominent sinuses on a coronal section. The CT shows opacification (whitening / soft-tissue filling) of the maxillary antrum, indicating its drainage (the ostium into the middle meatus / osteomeatal complex) is obstructed.

Step 3: Why option A is correct. The opacified, fluid/soft-tissue-filled large lateral sinus on the CT is the **maxillary sinus**; its blocked ostium prevents drainage, so it appears obstructed - matching option A.

Step 4: Why the others are wrong. (B) Frontal sinuses lie ABOVE the orbits in the frontal bone and are not the opacified space shown. **(C) Sphenoid** sinus is a single midline air space behind the ethmoids/posterior to the nasal cavity (best seen on more posterior cuts), not the large lateral sinus shown. **(D) Ethmoid** air cells are the small honeycomb cells between the orbits and the nose; they are not the large opacified antrum demonstrated.

Final answer: A. Maxillary.

Quick Tip: On CT-PNS, air is black and a blocked sinus opacifies (turns white). The large pyramidal sinus under each orbit is the maxillary - look for which one is whited out.

79. Intraoperatively which stain is used to view following lesion:



- (A) AgNo₃
- (B) Toluidine Blue
- (C) Congo red
- (D) Methylene blue

Correct Answer: (B) Toluidine Blue

Solution:

Step 1: Identify the lesion. The clinical photograph shows a suspicious red/erythematous and ulcerated mucosal lesion of the oral cavity, the kind of premalignant/malignant area (e.g. erythroplakia, leukoplakia with dysplasia, or early oral squamous cell carcinoma) for which the surgeon needs to delineate the true margins during surgery.

Step 2: Recall the role of vital staining. A vital (in-vivo) stain selectively highlights dysplastic or malignant mucosa so the operating surgeon can map abnormal tissue and guide where to take the biopsy or set the resection margin intraoperatively.

Step 3: Choose the correct dye. **Toluidine blue** is the classic vital stain used intraorally. It is a metachromatic, acidophilic dye that binds DNA/RNA; dysplastic

and malignant cells have increased nuclear material and wider intercellular canals, so they retain the dye and stain a deep royal blue, whereas normal mucosa washes clean. This makes it ideal for identifying and viewing the lesion intraoperatively. Hence option B is correct.

Step 4: Exclude the distractors.

- **AgNO₃ (silver nitrate):** a chemical cautery/escharotic agent used to control bleeding and burn off granulation tissue, not a vital stain for mapping oral malignancy.
- **Congo red:** stains amyloid (apple-green birefringence under polarised light) on histology slides; it is not an intraoral vital stain.
- **Methylene blue:** used for sentinel-node mapping and to stain Barrett oesophagus on chromoendoscopy, but the standard answer for viewing an oral premalignant/malignant lesion is toluidine blue.

Final answer: B. Toluidine Blue.

Quick Tip: Think of the metachromatic vital dye that dysplastic oral mucosa retains during surgery.

80. Gag reflex will be absent in which nerve injury?

- (A) 5 and 10
- (B) 9 and 10
- (C) 10 and 12
- (D) 7 and 9

Correct Answer: (B) 9 and 10

Solution:

Step 1: Define the gag reflex. The gag (pharyngeal) reflex is a protective reflex in which touching the posterior pharyngeal wall, soft palate or base of tongue triggers elevation and constriction of the pharynx to prevent aspiration.

Step 2: Identify the afferent (sensory) limb. The sensory information from the posterior pharyngeal wall and posterior third of the tongue travels through the **glossopharyngeal nerve (cranial nerve IX)**.

Step 3: Identify the efferent (motor) limb. The motor response — contraction of the pharyngeal constrictors and elevation of the palate — is carried mainly by the **vagus nerve (cranial nerve X)** via the pharyngeal plexus.

Step 4: Combine to answer. Because the reflex arc is IX (afferent) and X (efferent), an injury to cranial nerves **9 and 10** abolishes the gag reflex. Hence option B is correct.

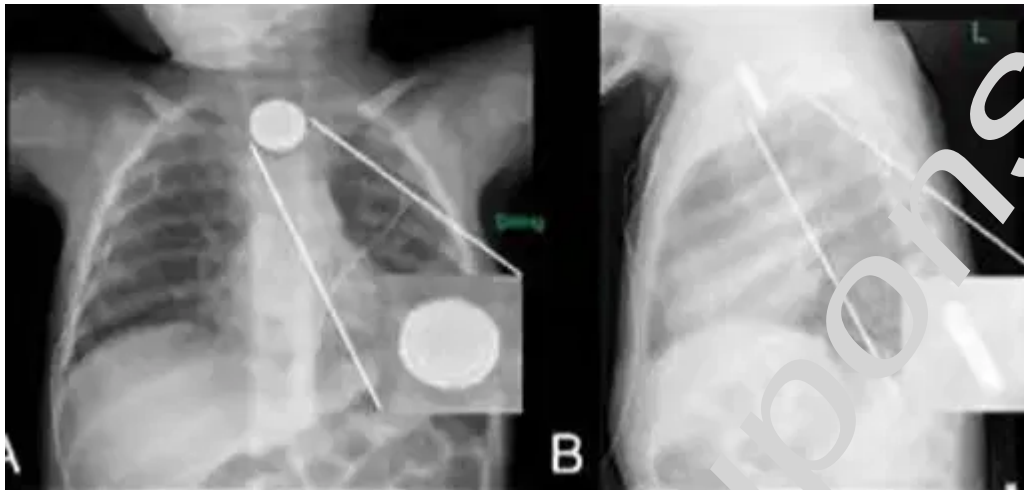
Step 5: Exclude the distractors.

- **5 and 10:** CN V (trigeminal) carries general sensation from the anterior tongue/face, not the gag arc.
- **10 and 12:** CN XII (hypoglossal) is pure tongue motor, not part of the gag reflex.
- **7 and 9:** CN VII (facial) supplies facial muscles and anterior-two-thirds taste, not the pharyngeal reflex.

Final answer: B. 9 and 10.

Quick Tip: Sensory limb = CN IX, motor limb = CN X; both must be intact for a gag.

81. In given x-ray which of the following sign is seen:



- (A) Double ring sign
- (B) String sign
- (C) Steeple sign
- (D) Thumb sign

Correct Answer: (A) Double ring sign

Solution:

Step 1: Read the radiograph. The image is an erect chest/abdominal radiograph in which free air outlines a structure, producing a double-walled ("ring within a ring") appearance — the classic **double ring (double-wall / Rigler) sign** seen when both the inner and outer surfaces of a hollow viscus become visible because gas is present on both sides (pneumoperitoneum) or air outlines a gas-containing cavity.

Step 2: Match the sign to its description. A **double ring sign** describes two concentric lucent/dense rings on a single film, which is exactly what this radiograph demonstrates. Hence option 1 is correct.

Step 3: Exclude the distractors by their classic settings.

- **String sign:** a thin string-like column of contrast through a narrowed segment — seen in Crohn disease (terminal ileum) or infantile hypertrophic pyloric stenosis on a contrast study, not on this plain film.
- **Steeple sign:** tapering subglottic narrowing of the tracheal air column on a

neck AP film in viral croup (laryngotracheobronchitis).

- **Thumb sign:** an enlarged, thumb-shaped epiglottis on a lateral neck radiograph in acute epiglottitis.

None of these matches the concentric double-ring pattern on the shown film.

Final answer: 1. Double ring sign.

Quick Tip: Two concentric rings on one plain film = the double ring (double-wall) sign.

82. Male not responding to O₂, diagnosis ARDS. What is the role of IL-8 in ARDS?

- (A) Endothelial cell activation
- (B) Requirement of neutrophil
- (C) Macrophage activation
- (D) Promote surfactant production

Correct Answer: (B) Requirement of neutrophil

Solution:

Step 1: Understand ARDS pathophysiology. Acute Respiratory Distress Syndrome (ARDS) is diffuse alveolar damage caused by an exaggerated inflammatory response. The hallmark is injury to the alveolar-capillary membrane leading to protein-rich exudative pulmonary edema, hypoxemia refractory to supplemental oxygen, and bilateral infiltrates. The central effector cell of this injury is the neutrophil.

Step 2: Identify what IL-8 (CXCL8) does. Interleukin-8 is a chemokine secreted by alveolar macrophages and epithelial cells. Its principal action is to act as a potent chemoattractant that recruits and activates neutrophils, drawing them from the circulation into the alveolar space. The recruited neutrophils then release reactive oxygen species, proteases (elastase) and pro-inflammatory mediators that damage the alveolar-capillary barrier. High BAL fluid IL-8 levels in

ARDS correlate with neutrophil influx and worse prognosis.

Step 3: Match to the option. Because IL-8's defining role is neutrophil chemotaxis/recruitment, the answer relating IL-8 to the “requirement of neutrophil” (i.e., it is required for neutrophil recruitment) is correct — **Option B.**

Step 4: Why the other options are wrong. (A) Endothelial cell activation is driven mainly by TNF- α and IL-1, not IL-8. (C) Macrophage activation is mediated by IFN- γ and other signals; macrophages are the source of IL-8, not its target. (D) Surfactant production is a function of type II pneumocytes and is actually impaired in ARDS — IL-8 does not promote it.

Final Answer: Option B — Requirement of neutrophil (neutrophil recruitment/chemotaxis).

Quick Tip: IL-8 (CXCL8) is the classic chemokine that calls in one specific leukocyte — think which cell does the alveolar damage in ARDS.

83. A patient presents with the finding as shown. What is the best investigation for Wilson?

- (A) Urine Copper
- (B) Hepatic copper
- (C) S. Ceruloplasmin
- (D) MRI Brain

Correct Answer: (B) Hepatic copper

Solution:

Step 1: Recall Wilson disease. Wilson disease is an autosomal-recessive defect of the ATP7B copper-transporting protein. Failure to excrete copper into bile causes copper accumulation in the liver, then the brain (basal ganglia) and eyes (Kayser-Fleischer rings). It presents with hepatic disease, neuro-psychiatric features and

KF rings.

Step 2: Compare the diagnostic tests. Several tests support the diagnosis: low serum ceruloplasmin, raised 24-hour urinary copper, KF rings on slit-lamp, and MRI brain changes. However, the single most accurate / confirmatory (“best” / gold-standard) test is the **liver biopsy hepatic copper quantification**, which shows markedly elevated dry-weight liver copper (typically $>250 \mu\text{g/g}$).

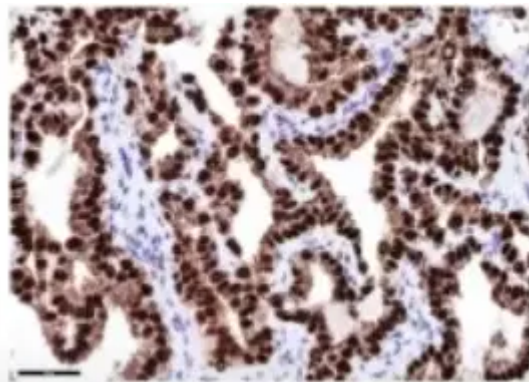
Step 3: Select the answer. Among the choices, hepatic (liver) copper estimation is the most definitive, so **Option B** is correct.

Step 4: Why the others are not “best”. (A) 24-hour urinary copper is a useful screening/monitoring test but can be raised in other cholestatic liver diseases. (C) Serum ceruloplasmin is a screening test and is normal in up to 10–15% of cases and falsely high as an acute-phase reactant. (D) MRI brain only shows non-specific basal-ganglia signal changes and supports neurological involvement, not a definitive diagnosis.

Final Answer: Option B — Hepatic copper (liver copper quantification).

Quick Tip: Screening tests (ceruloplasmin, urine copper) flag Wilson disease, but the gold-standard confirmation is measured directly in the organ that overloads first.

84. Which tumor is positive for TTF-1?



- (A) Sq (Squamous cell carcinoma)
- (B) Small (Small cell carcinoma)
- (C) Adeno Ca (Adenocarcinoma)
- (D) Carcinoid

Correct Answer: (C) Adeno Ca (Adenocarcinoma)

Solution:

Step 1: What is TTF-1? Thyroid Transcription Factor-1 (TTF-1, also called NKX2-1) is a nuclear transcription factor normally expressed in thyroid follicular cells and in lung type-II pneumocytes / Clara cells. As an immunohistochemical marker it stains tumours arising from these tissues.

Step 2: Apply to lung cancers. Among primary lung carcinomas, TTF-1 is characteristically positive in **pulmonary adenocarcinoma** (and also in small cell carcinoma). It is most useful, however, as the marker that distinguishes a lung-origin adenocarcinoma from squamous cell carcinoma and from metastases. The accompanying histology image of glandular/acinar tumour tissue is consistent with adenocarcinoma.

Step 3: Choose the answer. Of the listed options the classic TTF-1-positive tumour is adenocarcinoma — **Option C.**

Step 4: Why the others are less correct. (A) Squamous cell carcinoma is TTF-1 NEGATIVE and instead expresses p40 / p63 / CK5/6. (B) Small cell carcinoma can be TTF-1 positive, but it is neuroendocrine and not the answer the stem (with adenocarcinoma morphology) is pointing to. (D) Carcinoid (well-differentiated neuroendocrine tumour) is typically TTF-1 negative or only weakly positive and is identified by chromogranin/synaptophysin. Hence adenocarcinoma is the best single answer.

Final Answer: Option C — Adenocarcinoma.

Quick Tip: TTF-1 marks thyroid and lung type-II pneumocyte lineage — think which lung cancer forms glands and is the classic positive.

85. Vitamin to be supplemented after gastrectomy?

- (A) Vit A
- (B) Vit C
- (C) Vit B12
- (D) Vit D

Correct Answer: (C) Vit B12

Solution:

Step 1: Link gastrectomy to absorption physiology. The stomach's parietal cells secrete **intrinsic factor (IF)**. Vitamin B12 (cobalamin) binds intrinsic factor, and this B12–IF complex is the form absorbed in the terminal ileum.

Step 2: Effect of removing the stomach. After gastrectomy (total, or significant partial), parietal cells are lost, intrinsic factor falls, and dietary B12 can no longer be absorbed despite a normal ileum. Body B12 stores last a few years, so a megaloblastic anaemia/neurological deficiency develops months to years later unless B12 is supplemented (usually parenteral, since the oral IF-dependent route is gone).

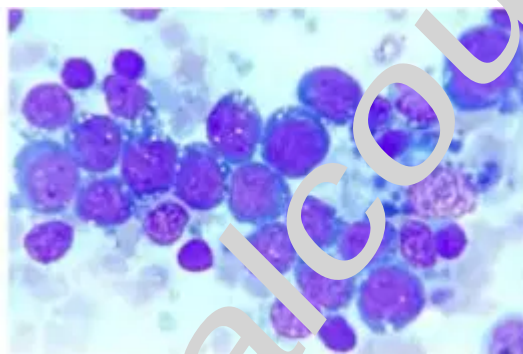
Step 3: Select the answer. The vitamin specifically requiring lifelong supplementation after gastrectomy is **Vitamin B12 — Option C**.

Step 4: Why the others are wrong. (A) Vitamin A is a fat-soluble vitamin absorbed in the small intestine and does not depend on the stomach. (B) Vitamin C is absorbed in the small intestine and is not gastric-dependent. (D) Vitamin D absorption occurs in the small intestine with bile and is unaffected by loss of intrinsic factor. None of these depend on intrinsic factor.

Final Answer: Option C — Vitamin B12.

Quick Tip: The stomach makes intrinsic factor; only one vitamin needs intrinsic factor to be absorbed.

86. 10/m presents with CERVICAL L. node+, Surface Ig +, CD3- −, 5−, 23−, tdt −, cd 10+, 19+:



- (A) Burkitts Lymphoma
- (B) DLBCL
- (C) Anaplastic
- (D) B-ALL

Correct Answer: (A) Burkitts Lymphoma

Solution:

Step 1: Decode the immunophenotype. A 10-year-old male with cervical lymphadenopathy. The flow markers are: **surface Ig positive, CD10 positive, CD19 positive, and TdT negative, CD34 negative.** Surface immunoglobulin and the absence of TdT/CD34 indicate a **mature (peripheral) B-cell**, not an immature precursor.

Step 2: Use the markers to localise the diagnosis. CD19 confirms B lineage; CD10 indicates a germinal-centre B-cell. A mature, CD10-positive, surface-Ig-positive B-cell tumour in a child presenting with nodal/extranodal mass is classically

Burkitt lymphoma. The smear shows the typical “starry-sky” high-grade lymphoid cells with vacuolated cytoplasm.

Step 3: Select the answer. Mature B phenotype (sIg+, TdT–, CD34–) + CD10+/CD19+ + child + rapidly growing mass = **Burkitt lymphoma** —

Option A.

Step 4: Why the others are wrong. (D) B-ALL is the key distractor: it is a **precursor** B-cell tumour and is TdT POSITIVE, CD34 POSITIVE and surface-Ig NEGATIVE — exactly the opposite of this case, so it is excluded. (B) DLBCL also is mature B, but it is predominantly an adult disease and is not the classic CD10+ “starry-sky” childhood high-grade lymphoma described here. (C) Anaplastic large cell lymphoma is a T-cell/null lymphoma expressing CD30/ALK and would not be CD19+/CD10+/sIg+.

Final Answer: Option A — Burkitt lymphoma.

Quick Tip: TdT–, CD34– and surface Ig+ mean a MATURE B-cell — that rules out the precursor leukaemia; then CD10+ + germinal-centre + child + starry-sky points to one high-grade lymphoma.

87. Most common mutation in Papillary cell CA?

- (A) BRAF V600E
- (B) RET
- (C) MET
- (D) RAS

Correct Answer: (A) BRAF V600E

Solution:

Step 1: Identify the tumour. “Papillary cell CA” here refers to papillary thyroid carcinoma (PTC), the most common malignancy of the thyroid, arising from

follicular epithelial cells. It is recognised by branching papillae and nuclear features (Orphan-Annie eye nuclei, nuclear grooves, pseudo-inclusions).

Step 2: Recall its driver mutations. PTC is driven by activation of the MAPK signalling pathway. The single **most common** genetic alteration is the **BRAF V600E** point mutation, found in roughly 40–60% of papillary thyroid cancers, and it is associated with more aggressive behaviour.

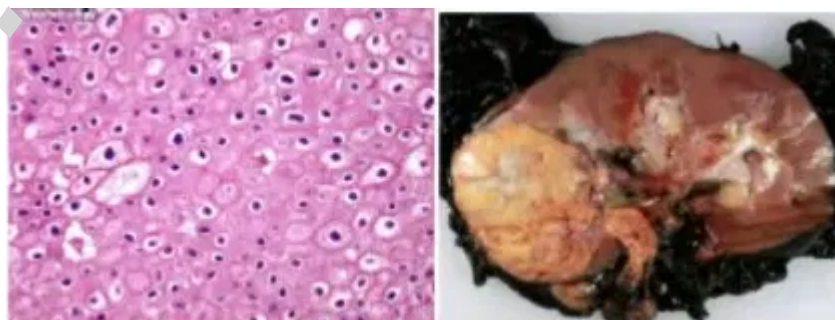
Step 3: Select the answer. Therefore the most common mutation in papillary thyroid carcinoma is **BRAF V600E — Option A.**

Step 4: Why the others are wrong. (B) RET rearrangement: **RET/PTC** rearrangements do occur in PTC (notably radiation-induced cases) but are far less frequent than BRAF; germline point mutation of RET instead causes **medullary** thyroid carcinoma/MEN-2. (C) MET mutations are characteristic of other cancers (e.g., papillary **renal** cell carcinoma), not thyroid PTC. (D) RAS mutations are seen but are more typical of follicular thyroid carcinoma and the follicular variant, and are less common than BRAF in classic PTC.

Final Answer: Option A — BRAF V600E.

Quick Tip: Papillary thyroid cancer is a MAPK-pathway tumour — the single most frequent driver is a V600E kinase point mutation.

88. Renal mass, haematuria, flank pain:



- (A) Clear cell
- (B) Papillary
- (C) Chromophobic
- (D) Bellini (Collecting duct / Bellini)

Correct Answer: (C) Chromophobic

Solution:

Step 1: Read the clinical triad and images. The classic renal cell carcinoma (RCC) triad is flank pain, haematuria and a palpable abdominal/flank mass — all present here. The question shows a histology slide and a gross specimen of the renal tumour, and asks which RCC subtype is depicted.

Step 2: Distinguish the subtypes by morphology. RCC subtypes differ histologically: clear cell RCC has lipid-rich clear cytoplasm with a delicate vascular network; papillary RCC has papillae with foamy macrophages and psammoma bodies; **chromophobe RCC** shows large polygonal cells with prominent (“plant-like”) cell membranes, perinuclear haloes and raisinoid wrinkled nuclei, and a solid sheet-like pattern; collecting-duct (Bellini) carcinoma is a rare, aggressive medullary tumour.

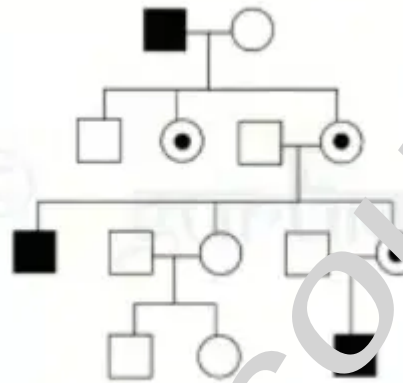
Step 3: Match to the previous answer. Based on the morphology shown (cells with well-defined membranes, perinuclear clearing and raisinoid nuclei consistent with the chromophobe pattern), the intended answer is **chromophobe RCC** — **Option C**, in line with the printed key (Ans. C).

Step 4: Why the other options are not selected. (A) Clear cell RCC is the most common type overall but shows clear (not granular, membrane-accentuated) cytoplasm — not the pattern keyed here. (B) Papillary RCC has fibrovascular papillae with foamy macrophages, absent in this case. (D) Bellini/collecting-duct carcinoma is a rare high-grade medullary tumour and is not the morphology shown.

Final Answer: Option C — Chromophobe RCC.

Quick Tip: Flank pain + haematuria + mass = RCC; then subtype from the slide — look for plant-cell-like thick membranes, perinuclear haloes and raisinoid nuclei.

89. Which disease will show the following mode of inheritance?



- (A) Wiskott (Wiskott-Aldrich syndrome)
- (B) Wilson
- (C) Prader willi
- (D) Achondroplasia

Correct Answer: (A) Wiskott (Wiskott-Aldrich syndrome)

Solution:

Step 1: Interpret the pedigree. The chart is a family pedigree (squares = males, circles = females; filled = affected). The pattern shown — only males affected, transmission through unaffected (carrier) females, no male-to-male transmission, and carrier females marked with a central dot — is the classic picture of **X-linked recessive inheritance**.

Step 2: Match the inheritance to a listed disease. Among the four options, the only X-linked recessive condition is **Wiskott-Aldrich syndrome** (immunodeficiency with eczema and thrombocytopenia, due to a mutation in the WAS gene on the X chromosome). Therefore **Option A** fits the pedigree.

Step 3: Select the answer. X-linked recessive pedigree → **Wiskott-Aldrich** —

Option A (consistent with the printed key, Ans. A).

Step 4: Why the others are wrong. (B) Wilson disease is **autosomal recessive** (ATP7B) — affects both sexes equally with horizontal pattern, not X-linked. (C) Prader-Willi syndrome results from loss of the paternal 15q11-13 region (imprinting/microdeletion), not an X-linked recessive pedigree. (D) Achondroplasia is **autosomal dominant** (FGFR3) — vertical transmission affecting both sexes, including male-to-male, which is absent here.

Final Answer: Option A — Wiskott-Aldrich syndrome.

Quick Tip: Only males affected, passed by carrier females, no father-to-son transmission = X-linked recessive — which listed disease is X-linked?

90. Young male died during exercise. History of similar history in a sibling. On gross morphology: septal thickening was seen. Most common cause of death?

- (A) DCM
- (B) RCM
- (C) HOCM
- (D) Viral Myocarditis

Correct Answer: (C) HOCM

Solution:

Step 1: Identify the clinical picture. A young male dies suddenly during exercise. There is a positive family history (a similarly affected sibling), and gross examination of the heart shows asymmetrical thickening of the interventricular septum. This triad — young patient, sudden cardiac death on exertion, autosomal dominant inheritance, and septal hypertrophy — is the classic description of Hypertrophic (Obstructive) Cardiomyopathy, HOCM.

Step 2: Why HOCM (option C) is correct. HOCM is the most common cause of

sudden cardiac death in young athletes. It is an autosomal dominant disorder caused by mutations in sarcomeric proteins (most commonly β -myosin heavy chain and myosin-binding protein C). The hallmark gross finding is asymmetrical septal hypertrophy. During exercise the hypertrophied septum, combined with systolic anterior motion of the mitral valve, obstructs the left ventricular outflow tract; the disorganised, hypertrophied myocardium is also highly arrhythmogenic, precipitating fatal ventricular arrhythmias.

Step 3: Why the other options are wrong. **DCM (Dilated Cardiomyopathy)** presents with a dilated, thin-walled, globular heart and progressive heart failure, not focal septal thickening. **RCM (Restrictive Cardiomyopathy)** shows a stiff, non-compliant ventricle of relatively normal wall thickness with biatrial enlargement, and does not classically cause exertional sudden death in a young person with septal hypertrophy. **Viral Myocarditis** shows a flabby heart with patchy lymphocytic inflammatory infiltrate, not asymmetrical septal hypertrophy, and lacks the strong familial pattern.

Final answer: Option C — HOCM.

Quick Tip: Young athlete + sudden death on exertion + family history + asymmetrical septal hypertrophy = the classic sarcomeric cardiomyopathy.

91. Which is not true?

- (A) vWD type 1 is mostly severe ds in children
- (B) vWD type 3 mostly severe ds in children
- (C) vWD type 2 is more related activity rather than levels
- (D) vWD type 3 has severely low VWD

Correct Answer: (A) vWD type 1 is mostly severe ds in children

Solution:

Step 1: Background on von Willebrand Disease (vWD). vWD is the most common inherited bleeding disorder, caused by a quantitative or qualitative defect in von Willebrand factor (vWF). vWF mediates platelet adhesion to subendothelium and carries factor VIII. It is classified into Type 1 (partial quantitative deficiency), Type 2 (qualitative defect — vWF is functionally abnormal), and Type 3 (near-complete quantitative deficiency / severe).

Step 2: Evaluate the statement that is NOT true. Option A says "vWD type 1 is mostly severe disease in children" — this is FALSE. Type 1 is the most common form (~75% of cases) and is characteristically a *mild* disorder with a partial reduction in vWF; it usually presents with mild mucocutaneous bleeding, not severe disease. Therefore option A is the incorrect (false) statement, which is what the question asks for.

Step 3: Why the other statements are TRUE (so not the answer). Option B — Type 3 is the most severe form, with virtually absent vWF, and presents in childhood with severe bleeding; TRUE. Option C — Type 2 is a qualitative/functional defect, so vWF activity (ristocetin cofactor activity) is reduced disproportionately to the vWF antigen level, i.e. it relates more to activity than to absolute level; TRUE. Option D — Type 3 has severely low vWF (essentially absent) and consequently very low factor VIII; TRUE.

Final answer: Option A — the statement that Type 1 vWD is mostly severe disease in children is NOT true.

Quick Tip: Type 1 vWD is the commonest and mildest form — any statement calling it "severe" is the false one.

92. Child. Sunlight causes eruptions, diagnosed as DNA repair defect. Which defect can it be?

- (A) Nucleotide excision
- (B) Base excision repair
- (C) Mismatch repair defect
- (D) Recombination defect

Correct Answer: (A) Nucleotide excision

Solution:

Step 1: Recognise the disease. A child who develops skin eruptions (severe photosensitivity, sunburn, freckling, and a high risk of skin cancers) on exposure to sunlight, due to an inherited DNA repair defect, has **Xeroderma Pigmentosum (XP)**.

Step 2: Link the disease to its repair pathway. Ultraviolet (UV) light in sunlight produces *pyrimidine (thymine) dimers* – covalent bonds between adjacent pyrimidines that distort the DNA helix. These bulky lesions are removed by the **Nucleotide Excision Repair (NER)** pathway. In XP, the genes coding for NER enzymes are mutated, so UV-induced dimers accumulate, leading to mutations, photosensitivity, and markedly increased skin cancer risk. Hence the defect is in nucleotide excision repair.

Step 3: Why the other options are wrong. **Base excision repair (BER)** corrects single damaged or modified bases (e.g. from oxidation, deamination, depurination), not bulky UV dimers. **Mismatch repair (MMR)** corrects base–base mismatches and insertion/deletion loops arising during replication; its defect causes Hereditary Non-Polyposis Colorectal Cancer (Lynch syndrome), not photosensitivity. **Recombination/double-strand-break repair** defects (e.g. Ataxia telangiectasia, Fanconi anaemia) cause radiosensitivity and other syndromes, not the UV photosensitivity of XP.

Final answer: Option A — Nucleotide excision (repair).

Quick Tip: Sunlight → UV → thymine dimers → these bulky lesions are cleared by nucleotide excision repair (defect = Xeroderma Pigmentosum).

93. 18/M. Hepatosplenomegaly, Hb 7 gm%, LN+, WBC 50K, Platelets 30, petechiae, purpura, fatigue. What is the most appropriate management?

- (A) Cytarabine + iso?
- (B) IVIG x 2 days
- (C) Prednisolone + Vinblastine
- (D) Radiotherapy to LN

Correct Answer: (C) Prednisolone + Vinblastine

Solution:

Step 1: Build the clinical picture. An 18-year-old male presents with hepatosplenomegaly, lymphadenopathy (LN+), anaemia (Hb 7 g/dL), a markedly raised white cell count (WBC 50,000 μ L), and thrombocytopenia (platelets 30,000/ μ L) manifesting as petechiae and purpura, along with fatigue. The combination of leucocytosis with anaemia and thrombocytopenia (i.e. marrow failure of the other two lineages) plus organomegaly and lymph node enlargement in a young patient is classic for **Acute Lymphoblastic Leukaemia (ALL)**, the commonest acute leukaemia in this age group, with prominent lymphadenopathy and hepatosplenomegaly.

Step 2: Choose the management. The backbone of ALL induction therapy is a corticosteroid (Prednisolone) plus Vincristine/Vinblastine, with additional agents such as L-asparaginase and an anthracycline. Among the options given, **Prednisolone + Vinblastine (option C)** represents this chemotherapy induction approach and is the most appropriate management of the underlying leukaemia.

Step 3: Why the other options are wrong. **Cytarabine + ... (option A)** is the backbone for Acute Myeloid Leukaemia (the "7+3" cytarabine–anthracycline regimen), which does not fit this picture of lymphadenopathy in a young patient. **IVIG x 2 days (option B)** treats immune (idiopathic) thrombocytopenic purpura — but ITP causes isolated thrombocytopenia, NOT pancytopenia with high WBC, organomegaly, and lymphadenopathy, so it does not address this disease. **Radiotherapy to lymph nodes (option D)** is a localised treatment used in

lymphomas; it cannot treat a systemic leukaemia with marrow involvement and circulating blasts.

Final answer: Option C — Prednisolone + Vinblastine.

Quick Tip: Young patient, high WBC with anaemia + thrombocytopenia + nodes + hepatosplenomegaly = ALL; pick the steroid + vinca alkaloid induction.

94. A baby failed to pass meconium. In this disease, the structures absent are absent in which of the following layer(s)?



Select the correct answer from the given below cord:

- (A) 1 n 2
- (B) 2 n 3
- (C) 3 n 4
- (D) 1 n 4

Correct Answer: (B) 2 n 3

Solution:

Step 1: Identify the disease. A neonate who fails to pass meconium has **Hirschsprung disease (congenital aganglionic megacolon)**. It results from failure of neural crest cells to migrate to the distal bowel, so the affected segment lacks ganglion cells of the enteric nervous system, causing a functional obstruction (failure to pass meconium).

Step 2: Locate the missing structures. The "structures absent" are the *ganglion cells / nerve plexuses* of the enteric nervous system. There are two such plexuses in the bowel wall:

- The **submucosal (Meissner's) plexus** — located in the *submucosa* (layer 2).
- The **myenteric (Auerbach's) plexus** — located in the *muscularis*, between the inner circular and outer longitudinal muscle layers (the *muscular layer*, layer 3).

So the ganglion cells are absent from the **submucosal and muscular layers** — i.e. layers 2 and 3.

Step 3: Map to the options. Layer 1 = Epithelial (mucosa), Layer 2 = Submucosa, Layer 3 = Muscular, Layer 4 = Serosa. The plexuses lie in the submucosa (2) and muscularis (3), so the correct combination is **2 and 3**.

Step 4: Why the others are wrong. The epithelium (1) is a lining layer with no enteric ganglia, and the serosa (4) is the outer covering with no plexus; therefore any combination including 1 or 4 is incorrect.

Final answer: Option B — 2 and 3 (submucosa and muscular layers).

Quick Tip: Hirschsprung = absent ganglion cells of Meissner's (submucosa) and Auerbach's (muscularis) plexuses → layers 2 and 3.

95. Muscle responsible for ptosis in Horner syndrome:-



- (A) Orbicularis oculi
- (B) Levator palpebrae
- (C) Horner muscle
- (D) Mullers muscle

Correct Answer: (D) Mullers muscle

Solution:

Step 1: Understand Horner syndrome. Horner syndrome results from interruption of the *sympathetic* supply to the eye. Its classic triad is partial ptosis (drooping upper lid), miosis (constricted pupil), and anhidrosis (loss of sweating) on the affected side, often with apparent enophthalmos.

Step 2: Identify the muscle causing the ptosis. The upper eyelid is elevated by two muscles: the **Levator Palpebrae Superioris (LPS)**, a skeletal muscle supplied by the oculomotor nerve (CN III), and the **superior tarsal muscle (Müller's muscle)**, a smooth muscle that receives *sympathetic* innervation. In Horner syndrome the sympathetic supply is lost, so Müller's muscle is paralysed, producing the characteristic *partial* (mild) ptosis. Hence Müller's muscle is responsible.

Step 3: Why the other options are wrong. **Orbicularis oculi** is the lid *closer* (supplied by the facial nerve); its paralysis causes inability to close the eye, not ptosis. **Levator palpebrae superioris** is the main elevator but is supplied by CN III, not the sympathetic system; its paralysis causes a complete ptosis (as in third nerve palsy), not the partial ptosis of Horner syndrome. "**Horner muscle**" (the lacrimal part of orbicularis oculi, pars lacrimalis) is concerned with tear drainage, not lid elevation.

Final Answer: Option D — Müller's muscle (superior tarsal muscle).

Quick Tip: Horner = sympathetic loss; the only sympathetically-supplied lid elevator is Müller's (superior tarsal) muscle, giving partial ptosis.

96. A patient presented to eye OPD after 3 years of cataract surgery. Slit lamp finding was given. What is the likely diagnosis?



- (A) PCO
- (B) Bullous keratopathy
- (C) Phakic glaucoma
- (D) Lens subluxation

Correct Answer: (A) PCO

Solution:

Step 1: Note the timing. The patient returns 3 years AFTER cataract surgery with a slit-lamp abnormality. The commonest late complication of cataract surgery (extracapsular cataract extraction / phacoemulsification with an intraocular lens) is **Posterior Capsular Opacification (PCO)**, also called an "after-cataract" or secondary cataract.

Step 2: Why PCO fits the slit-lamp picture. PCO occurs when residual lens epithelial cells proliferate and migrate across the posterior capsule that was left in place to support the intraocular lens. This produces opacities — classically pearl-like *Elschnig pearls* and wrinkling/fibrosis of the posterior capsule (a "fish-egg" appearance) seen on the slit lamp behind the IOL. It presents months to years after surgery with gradually declining vision and glare, exactly matching the 3-year interval here. It is treated with Nd:YAG laser capsulotomy.

Step 3: Why the other options are wrong. **Bullous keratopathy** is corneal oedema with epithelial bullae due to endothelial damage; it is a corneal (not capsular) problem and the slit-lamp shows corneal oedema, not capsular pearls.

Phakic glaucoma is not a standard diagnosis and would relate to raised intraocular pressure, not a slit-lamp capsular opacity. **Lens subluxation** implies a displaced lens (e.g. trauma, Marfan), but after cataract surgery the natural lens has been removed and an IOL placed, so this does not fit the classic late post cataract picture.

Final answer: Option A — PCO (Posterior Capsular Opacification).

Quick Tip: Vision drop years after cataract surgery with a poorly wrinkled membrane behind the IOL = posterior capsular opacification, treated by Nd:YAG capsulotomy.

97. Following perimetry image is suggestive of:



- (A) Extension of blind spot
- (B) Arcuate scotoma
- (C) Reinee step defect
- (D) Altitude Anopia

Correct Answer: (B) Arcuate scotoma

Solution:

Step 1: Interpret the perimetry. Perimetry (visual field testing) maps areas of reduced sensitivity (scotomas) in the visual field. The image shown demonstrates a curved (arcuate / comma-shaped) region of field loss arching from the blind spot around the fixation point toward the nasal field — the classic pattern of a glaucomatous nerve-fibre-layer defect.

Step 2: Why arcuate scotoma (option B) is the answer. Because retinal nerve fibres run in an arcuate course around the macula (following the arrangement of arcuate/Bjerrum fibres), damage to a bundle of these fibres — as in glaucoma — produces a curved "arcuate scotoma" that starts at the blind spot and sweeps around fixation. This is the most characteristic and commonly tested early glaucomatous field defect, and it matches the curved comma-shaped defect on the perimetry shown.

Step 3: Why the other options are less correct. **Extension of the blind spot** is enlargement of the physiological blind spot (seen e.g. in papilloedema), appearing as a localised area around the blind spot rather than a long curved arc. **Roenne's (Reinee) nasal step defect** is a step-like difference in the field across the horizontal nasal meridian — a specific later glaucomatous sign — but the broad curved defect shown is best described as an arcuate scotoma. **Altitudinal anopia/hemianopia** is loss of the entire upper or lower half of the field along the horizontal midline, typical of anterior ischaemic optic neuropathy, which is not the curved arc shown.

Final answer: Option B — Arcuate scotoma. (Note: no printed answer key was available for this item; the answer is derived from the classic glaucomatous arcuate field pattern shown.)

Quick Tip: A curved comma-shaped field defect arching from the blind spot around fixation is the classic glaucomatous arcuate scotoma.

98. A patient came with nyctalopia. Fundus image given below, what will be the diagnosis.



- (A) Retinitis pigmentosa
- (B) Vit A deficiency
- (C) Retinal detachment
- (D) Diabetic retinopathy

Correct Answer: (A) Retinitis pigmentosa

Solution:

Step 1: Identify the key symptom. Nyctalopia means night blindness, i.e. defective vision in dim light. It arises when the rod photoreceptors (responsible for scotopic/low-light vision) are damaged or dysfunctional.

Step 2: Read the fundus picture. The fundus shows the classic triad of retinitis pigmentosa: (i) bony-spicule pigmentation in the mid-peripheral retina, (ii) attenuated (thin) retinal arterioles, and (iii) a waxy pale optic disc. These features, together with lifelong progressive night blindness, point to retinitis pigmentosa.

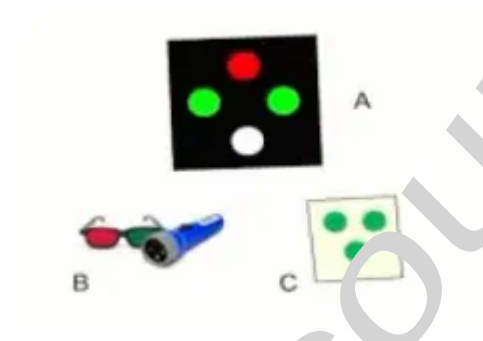
Step 3: Confirm the correct option. Retinitis pigmentosa is a hereditary, progressive rod-cone dystrophy. Rods degenerate first, producing early nyctalopia and ring (tubular/tunnel) field loss, followed later by central vision loss. The fundus appearance matches option A.

Step 4: Exclude the distractors. Vitamin A deficiency also causes nyctalopia, but its ocular signs are conjunctival xerosis, Bitot spots and corneal xerosis/keratomalacia — not bony-spicule retinal pigment; so B is wrong. Retinal detachment shows an elevated, billowing grey retina and sudden curtain-like field loss, not symmetrical pigment spicules; C is wrong. Diabetic retinopathy shows microaneurysms, dot-blot haemorrhages, hard exudates and neovascularisation, and presents with blurring rather than isolated night blindness; D is wrong.

Final answer: Option A — Retinitis pigmentosa.

Quick Tip: Night blindness plus bony-spicule pigment, thin vessels and a waxy disc on fundus = a hereditary rod-cone dystrophy.

99. Patient was shown image A along with image B. Image C was visualised. Likely diagnosis?



- (A) Lt eye suppression
- (B) Rt eye suppression
- (C) Crossed diplopia
- (D) Uncrossed diplopia

Correct Answer: (B) Rt eye suppression

Solution:

Step 1: Recognise the test. The picture shows the Worth four-dot test, used to assess binocular single vision, suppression and diplopia. The patient wears red-green goggles (red over one eye, green over the other) and looks at a panel of four lights — one red (top), two green (sides) and one white (bottom).

Step 2: Understand the colour logic. The red filter lets the eye see only the red light(s), the green filter lets the eye see only the green light(s). The white light is seen as red or green depending on which eye is dominant. So the number and colour of dots perceived tells us the binocular status.

Step 3: Interpret image C. Image C (the perceived result) shows only the green dots — the red dot from the red-filtered eye is not perceived. Seeing only the green lights means the eye behind the green filter is dominant and the eye

behind the red filter is being suppressed. In this question the red goggle is over the right eye, so absence of the red dots means the right eye is being suppressed.

Step 4: Confirm and exclude. Perceiving only green dots = suppression of the red-goggled (right) eye, so B is correct. Left eye suppression would show only the red dot(s); A is wrong. Diplopia in the Worth test shows all five lights (two red + three green = five spots): crossed diplopia in exotropia and uncrossed diplopia in esotropia — but here only green dots are seen, not five, so C and D are wrong.

Final answer: Option B — Right eye suppression.

Quick Tip: Worth four-dot test: seeing only the green lights means the red-goggled eye is being suppressed — note which eye has the red filter.

100. A patient presents in eye OPD with the finding. What is it?



- (A) Dermoid
- (B) Lipodermoid
- (C) Pterygium
- (D) Papilloma

Correct Answer: (C) Pterygium

Solution:

Step 1: Describe the lesion in the photo. The clinical photograph shows a triangular (wing-shaped) fold of fibrovascular conjunctival tissue encroaching from the nasal limbus onto the cornea, with its apex pointing toward the centre

of the cornea. This is the hallmark of a pterygium.

Step 2: Recall the concept. A pterygium is a degenerative, UV-light/dust/wind-related overgrowth of bulbar conjunctiva (with elastotic degeneration of subconjunctival tissue) that grows across the limbus onto the cornea – most often from the nasal side. It can cause irritation, redness, astigmatism, and if it crosses the pupil, reduced vision.

Step 3: Confirm the answer. The triangular shape, nasal location, and crossing of the limbus onto the cornea are diagnostic of pterygium; option C is correct.

Step 4: Exclude the distractors. A (limbal) dermoid is a congenital, dome-shaped, rounded yellow-white solid mass that straddles the limbus, often at the inferotemporal limbus, and may bear hair – not a flat wing-shaped fold; A is wrong. A lipodermoid is a soft, yellowish, mobile subconjunctival fatty mass located at the temporal canthus/fornix, not crossing the cornea; B is wrong. A conjunctival papilloma is a fleshy, pink, lobulated cauliflower/raspberry-like growth, not a flat triangular limbal fold; D is wrong.

Final answer: Option C – Pterygium.

Quick Tip: A triangular wing-shaped fold of fibrovascular conjunctiva creeping from the nasal limbus onto the cornea is the giveaway.

101. In Wilson disease, the best choice of investigation is:

- (A) Serum copper
- (B) Ceruloplasmin
- (C) Hepatic copper estimation
- (D) Urine copper

Correct Answer: (B) Ceruloplasmin

Solution:

Step 1: Recall the disease. Wilson disease (hepatolenticular degeneration) is an autosomal-recessive defect of the ATP7B copper-transporting ATPase. The hepatocyte cannot incorporate copper into ceruloplasmin nor excrete copper into bile, so copper accumulates in the liver, brain (basal ganglia), cornea (Kayser-Fleischer rings) and other organs.

Step 2: Link the defect to the screening test. Because copper cannot be loaded onto apoceruloplasmin, the circulating ceruloplasmin level is characteristically LOW. A reduced serum ceruloplasmin is the standard, widely available first-line/screening biochemical investigation for Wilson disease (typically <20 mg/dL).

Step 3: Confirm the correct option. Among the listed choices, ceruloplasmin is the best routine investigation, so option B is correct. (It is best combined with a 24-hour urinary copper and slit-lamp exam for KF rings; liver biopsy copper is the gold standard for confirmation but is invasive.)

Step 4: Exclude the distractors. Serum (total) copper is often low or normal and is unreliable because most circulating copper is ceruloplasmin-bound, while it is the FREE copper that rises — so A is not the best single test. Hepatic (liver biopsy) copper estimation is the confirmatory gold standard but is invasive and not the practical 'best choice' screening investigation; C is not the intended answer. 24-hour urinary copper is elevated and useful (especially for diagnosis and monitoring) but is a supportive test rather than the single best routine investigation here; D is not the best.

Final answer: Option B — Ceruloplasmin.

Quick Tip: The hepatocyte cannot load copper onto its carrier protein — so that carrier protein is low in the blood and is the easy first test.

102. Clinical scenario about homocystinuria — which vitamin should be supplemented?

- (A) Thiamine
- (B) B6
- (C) Biotin
- (D) Pyruvate

Correct Answer: (B) B6

Solution:

Step 1: Identify the enzyme defect. Classic homocystinuria is most commonly caused by deficiency of cystathionine beta-synthase (CBS), the enzyme that condenses homocysteine with serine to form cystathionine in the trans-sulphuration pathway. The block causes accumulation of homocysteine and methionine.

Step 2: Recall the cofactor. Cystathionine beta-synthase requires pyridoxal phosphate (the active form of vitamin B6) as its coenzyme. Many patients have a pyridoxine-responsive form in which giving high-dose vitamin B6 (pyridoxine) restores residual enzyme activity and lowers homocysteine.

Step 3: Confirm the correct option. Therefore vitamin B6 (pyridoxine) is the vitamin supplemented in homocystinuria; option B is correct. (Folate and B12, which support remethylation of homocysteine to methionine, are often added, but the answer choice tied to CBS is B6.)

Step 4: Exclude the distractors. Thiamine (B1) is the cofactor for pyruvate dehydrogenase, alpha-ketoglutarate dehydrogenase and transketolase — relevant to maple syrup urine disease and Wernicke encephalopathy, not homocystinuria; A is wrong. Biotin is the cofactor for carboxylases (e.g. pyruvate carboxylase, propionyl-CoA carboxylase) and is used in biotinidase deficiency, not homocystinuria; C is wrong. Pyruvate is a metabolite, not a vitamin, and is not a treatment for homocystinuria; D is wrong.

Final answer: Option B — B6.

Quick Tip: The deficient enzyme is cystathionine beta-synthase — think of which vitamin's active form (pyridoxal phosphate) is its coenzyme.

103. A 2-week-old baby presented with vomiting, acidosis and early cataract. Which of the following enzyme is defective?

- (A) Galactose 1 Po4 uridyl transferase
- (B) Galactokinase
- (C) Hexokinase
- (D) Aldol reductase

Correct Answer: (A) Galactose 1 Po4 uridyl transferase

Solution:

Step 1: Read the clinical picture. A neonate (about 2 weeks old) with vomiting, metabolic acidosis, failure to thrive and cataract after starting milk is the classic presentation of classic galactosemia. Other features include hepatomegaly, jaundice, hypoglycemia and a predisposition to E. coli sepsis.

Step 2: Recall the metabolic block. Classic galactosemia is caused by deficiency of galactose-1-phosphate uridyltransferase (GALT). This enzyme normally converts galactose-1-phosphate (with UDP-glucose) into UDP-galactose. Its deficiency causes galactose-1-phosphate to accumulate, which is toxic to the liver, kidney and brain, producing the severe systemic illness.

Step 3: Explain the cataract. Excess galactose is shunted by aldose reductase to galactitol, which accumulates in the lens, draws in water osmotically and causes early (oil-droplet) cataract. The systemic features (vomiting, acidosis, hepatic involvement) come from the toxic galactose-1-phosphate, which is why the severe form is GALT (transferase) deficiency.

Step 4: Exclude the distractors. Galactokinase deficiency causes a milder disease — isolated cataracts only (from galactitol), WITHOUT vomiting, acidosis or hepatic/renal damage — so B does not fit a baby with systemic illness. Hexokinase phosphorylates glucose in glycolysis and is unrelated to the presentation; C is wrong. Aldose reductase (the option's 'aldol reductase') actually PRODUCES galactitol that causes the cataract — it is not deficient; its deficiency would protect against cataract, so D is wrong.

Final answer: Option A — Galactose-1-phosphate uridylyl transferase.

Quick Tip: Vomiting + acidosis + hepatic illness + cataract in a milk-fed neonate = the severe (classic) form, not the cataract-only galactokinase form.

104. Diagnosis of the MRI image:



- (A) Arnold Chiari Malformation
- (B) Corpus callosum agenesis
- (C) Vein of Galen Malformation
- (D) Dandy Walker Malformation

Correct Answer: (A) Arnold Chiari malformation

Solution:

Step 1: Read the image. The picture is a midsagittal MRI of the brain. The key finding is downward herniation of the cerebellar tonsils through the foramen magnum into the upper cervical canal (peg-like tonsils extending below the foramen magnum). This is the hallmark of an Arnold-Chiari (Chiari) malformation.

Step 2: Recall the entity. In Chiari I/II malformation, the posterior fossa is small and the cerebellar tonsils (and in Chiari II also the vermis, brainstem and fourth ventricle) are displaced caudally below the foramen magnum. It may be associated with syringomyelia, hydrocephalus and (in Chiari II) a myelomeningocele.

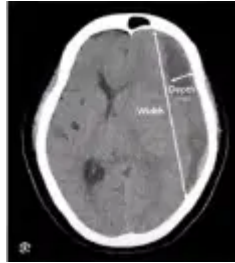
Step 3: Confirm the correct option. The sagittal MRI showing tonsillar descent through the foramen magnum is diagnostic of Arnold-Chiari malformation; option A is correct.

Step 4: Exclude the distractors. Corpus callosal agenesis shows absence of the corpus callosum with parallel/widely spaced lateral ventricles, a high-riding third ventricle and a radial 'sunburst gyra' pattern — not tonsillar herniation; B is wrong. Vein of Galen malformation appears as a large, rounded, midline flow-void/vascular dilatation in the region of the great cerebral vein (often with high-output cardiac failure in a neonate); C is wrong. Dandy-Walker malformation shows cystic dilatation of the fourth ventricle with vermian hypoplasia/agenesis and an enlarged posterior fossa — the cerebellum is splayed open, not herniated downward; D is wrong.

Final answer: Option A — Arnold Chiari malformation.

Quick Tip. On midsagittal MRI, look for the cerebellar tonsils herniating like pegs below the foramen magnum.

105. A 76-year-old elderly patient presents in a confused state. He is on antihypertensive medication and on aspirin due to a previous heart attack. There is a minor trauma due to a fall from a chair 3 weeks back. NCCT is done and shown below. Diagnosis?



- (A) SAH
- (B) EDH
- (C) Normal Study
- (D) Chronic SDH

Correct Answer: (D) Chronic SDH

Solution:

Step 1: Weigh the clinical clues. An elderly man (age causes brain atrophy and stretched bridging veins), on aspirin (bleeding tendency), with a MINOR fall 3 weeks ago and now confusion, is the textbook setting for a chronic subdural haematoma. The 3-week interval between trauma and symptoms is highly suggestive.

Step 2: Read the NCCT. The non-contrast CT shows a crescent-shaped (concave toward the brain) extra-axial collection over the cerebral convexity that crosses suture lines, with mass effect/midline shift. As the blood is old, it appears HYPODENSE (dark) or mixed density rather than bright — confirming a chronic subdural haematoma.

Step 3: Confirm the correct option. Crescentic, suture-crossing, hypodense convexity collection + elderly + remote minor trauma + anticoagulant/antiplatelet use = chronic subdural haematoma; option D is correct.

Step 4: Exclude the distractors. Subarachnoid haemorrhage (SAH) shows hyperdense blood within the sulci, basal cisterns and fissures (a 'starfish' pattern), usually with thunderclap headache, not a crescentic convexity collection 3 weeks after a fall; A is wrong. Extradural/epidural haematoma (EDH) is a biconvex (lens-shaped) hyperdense collection that does NOT cross suture lines, classically arterial (middle meningeal artery) after temporal trauma with a lucid interval — not this chronic, crescentic, hypodense picture; B is wrong. A normal study is excluded by the obvious extra-axial collection and mass effect; C is wrong.

Final answer: Option D — Chronic SDH.

Quick Tip: Elderly, on aspirin, minor fall weeks ago, now confused — look for a hypodense crescent that crosses sutures, not a bright lens shape.

106. Taste absent in which taste bud?

- (A) Filiform
- (B) Foliate
- (C) Papilla
- (D) Circumvallate

Correct Answer: (A) Filiform

Solution:

Step 1: Recall the four types of tongue papillae. The dorsum of the tongue carries filiform, fungiform, foliate and circumvallate (vallate) papillae.

Step 2: Match papillae to taste buds.

- Fungiform, foliate and circumvallate papillae carry taste buds and therefore subserve the sense of taste.
- Filiform papillae are the only papillae that contain NO taste buds. They are the most numerous, conical, keratinised projections whose role is purely

mechanical — providing friction/grip and general (touch) sensation — not gustation.

Step 3: Apply to the question. Since taste is **absent** in the papilla that lacks taste buds, the answer is the **filiform** papilla. Hence option A is correct.

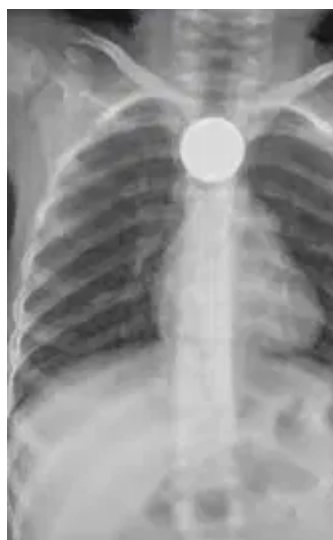
Step 4: Exclude the distractors.

- **Foliate (B):** leaf-like folds on the lateral posterior tongue that DO contain taste buds.
- **Papilla (C):** a generic term, not a specific taste-bud-free type; too vague to be the answer.
- **Circumvallate (D):** the large V-shaped papillae anterior to the sulcus terminalis that are richly supplied with taste buds.

Final answer: A. Filiform (filiform).

Quick Tip: Which tongue papilla is the only one with no taste buds and is purely mechanical?

107. Which of the following may be true in this patient



- (A) Oesophagus is the correct site
- (B) Most commonly in adult
- (C) Mostly above cricoid
- (D) Mediastinal infection not present

Correct Answer: (A) Oesophagus is the correct site

Solution:

Step 1: Interpret the radiograph. The chest x-ray shows a round, flat radio-opaque foreign body (the classic "coin" appearance) lying in the upper mediastinum. A coin seen *en face* (full circle on the frontal film) indicates that it is lodged in the **oesophagus**, because the oesophagus is flattened front-to-back so a flat disc orients its broad face toward the frontal view; a coin in the trachea would instead appear edge-on (a thin line) on the AP film.

Step 2: Evaluate option A. A swallowed coin most commonly impacts at the narrowest point of the oesophagus — the cricopharyngeal/upper oesophageal sphincter (C6 level). The radiographic orientation confirms the **oesophagus is the correct site** of the foreign body. Hence option A is true and is the answer.

Step 3: Exclude the distractors.

- **Most commonly in adult (B):** false — oesophageal foreign body / coin ingestion is most common in **children** (typically 6 months to 3 years), not adults.
- **Mostly above cricoid (C):** false — the impaction is at/just below the cricopharynx (cricopharyngeal narrowing), i.e. at the level of the cricoid, not above it; the food/foreign body lodges in the oesophagus, which begins at the lower border of the cricoid.
- **Mediastinal infection not present (D):** false as a generalisation — a retained or perforating oesophageal foreign body can erode the wall and cause **mediastinitis**, a recognised dangerous complication, so one cannot state infection is absent.

Final answer: A. Oesophagus is the correct site.

Quick Tip: A coin seen as a full circle on the AP film lies in the flat oesophagus, not the trachea.

108. A patient presented with c/o hearing loss and the otoscopy finding shown. What will be the Rinne test finding?



- (A) True positive
- (B) True negative
- (C) False positive
- (D) False negative

Correct Answer: (B) True negative

Solution:

Step 1: Interpret the otoscopy. The otoscopic image shows an abnormal tympanic membrane / middle-ear pathology (e.g. a perforation, retraction or middle-ear disease), consistent with a **conductive hearing loss (CHL)** in that ear.

Step 2: Recall how the Rinne test works. A tuning fork (512 Hz) compares air conduction (AC, fork held near the ear canal) with bone conduction (BC, fork on the mastoid). Normally $AC > BC$, called **Rinne positive**. In conductive hearing loss the air-conduction pathway is impaired so $BC > AC$ in that ear, called **Rinne negative**.

Step 3: Define the qualifiers. A **true (Rinne) negative** is a genuine negative Rinne caused by true conductive loss in the tested ear ($BC > AC$ because of that ear's middle-ear pathology). A **false (Rinne) negative** occurs in **severe/total sensorineural loss** of the tested ear, where the patient hears the bone-conducted sound through the opposite (better) cochlea by cross-conduction and so reports $BC > AC$ even though there is no conductive component.

Step 4: Apply to this patient. The otoscopy demonstrates genuine middle-ear (conductive) pathology, so the negative Rinne is real — a **true negative**. Hence option B is correct.

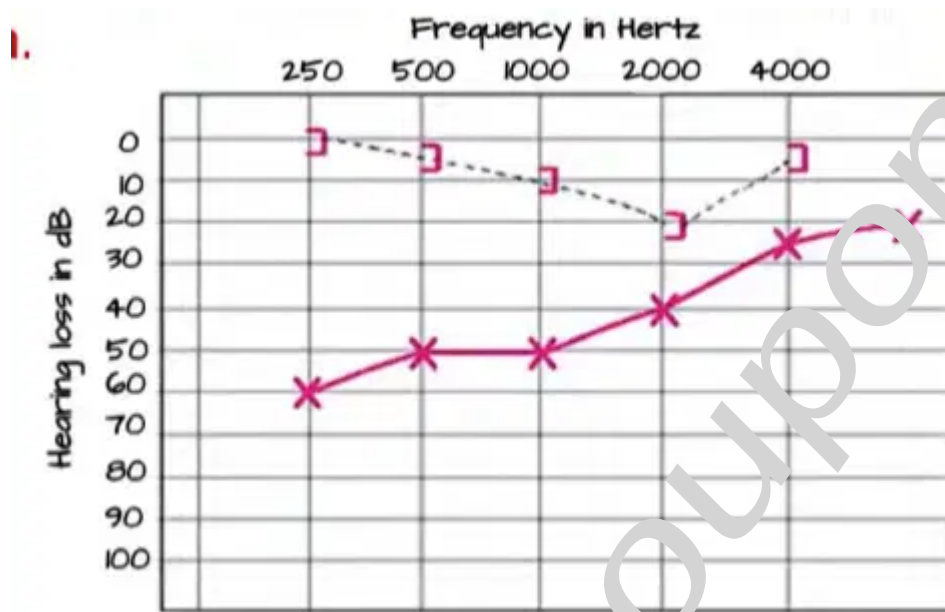
Step 5: Exclude the distractors.

- **True positive (A):** $AC > BC$, a normal/healthy or sensorineural-loss ear — does not fit the visible CHL.
- **False positive (C):** not a standard meaningful Rinne category here.
- **False negative (D):** requires severe SNHL with cross-hearing, not the conductive picture shown.

Final answer: B. True negative.

Quick Tip: Conductive loss gives $BC > AC$ (Rinne negative); if the otoscopy proves real middle-ear disease, the negative is true.

109. A Female with mild CHL and tinnitus. The PTA is shown. What is the interpretation.



- (A) Otosclerosis
- (B) Meniere's disease
- (C) NIHL
- (D) None

Correct Answer: (A) Otosclerosis

Solution:

Step 1: Synthesise the clinical clue. A young/middle-aged **female** with progressive **mild conductive hearing loss (CHL)** and **tinnitus** is the textbook presentation of **otosclerosis** (often worse in pregnancy, with a female predilection).

Step 2: Read the pure-tone audiogram (PTA). The audiogram shows an air-bone gap (air conduction worse than bone conduction) confirming a conductive loss, with the hallmark **Carhart's notch** — a dip in the bone-conduction threshold of about 15–20 dB maximal around **2000 Hz**. This Carhart notch is the classic audiometric sign of otosclerosis caused by altered ossicular (stapes) mechanics.

Step 3: Match to the diagnosis. Female + conductive loss + tinnitus + air-bone

gap with a 2 kHz Carhart notch points to **otosclerosis**. Hence option A is correct.

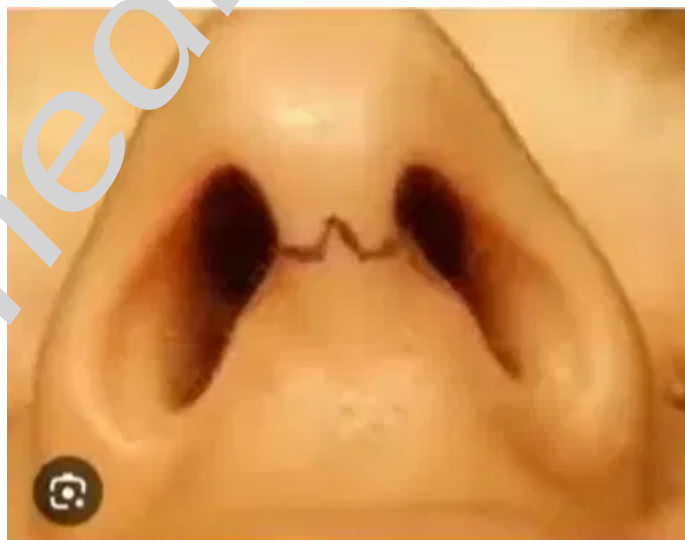
Step 4: Exclude the distractors.

- **Meniere's disease (B):** produces a *sensorineural* (usually low-frequency, fluctuating) loss with vertigo and aural fullness, not a conductive loss with a Carhart notch.
- **NIHL — noise-induced hearing loss (C):** gives a *sensorineural* notch at **4000 Hz** (not 2000 Hz) with a history of noise exposure, and is conductive only when... it is not — NIHL is sensorineural, so it does not fit a CHL.
- **None (D):** incorrect, since the clinico-audiometric picture fits otosclerosis well.

Final answer: A. Otosclerosis.

Quick Tip: Female + conductive loss + tinnitus + a bone-conduction dip (Carhart's notch) at 2 kHz.

110. A nasal surgery was done in this patient and the incision mark is shown. Which of these is probably done?



- (A) Septoplasty
- (B) Rhinoplasty
- (C) FESS
- (D) Young's surgery

Correct Answer: (B) Rhinoplasty

Solution:

Step 1: Identify the visible landmark. The clinical photograph shows the undersurface (base) of the nose with an incision across the columella (the strip of skin between the two nostrils). This trans-columellar incision, usually a stair-step or inverted-V incision joined to marginal incisions inside each nostril, is the signature of the **open (external) rhinoplasty** approach.

Step 2: Why Rhinoplasty (Option B) is correct. Open rhinoplasty is performed to reshape the external nasal framework (dorsum, tip, cartilages). To gain wide exposure of the lower lateral cartilages and the nasal tip, the surgeon makes an external incision on the columella and lifts the skin envelope. Hence a visible columellar incision scar points specifically to rhinoplasty.

Step 3: Why the other options are wrong.

- **Septoplasty (A)** corrects a deviated nasal septum through an *endonasal* hemitransfixion/Killian incision made on the mucosa inside the nostril — it leaves no external columellar scar.
- **FESS (C)** — Functional Endoscopic Sinus Surgery is done entirely through the nostrils with an endoscope to clear the sinus ostia; there is no external skin incision at all.
- **Young's surgery (D)** is closure of the nostrils (used in atrophic rhinitis) by raising skin flaps just inside the nasal vestibule — it does not produce a columellar scar.

Final answer: B (Rhinoplasty).

Quick Tip: An incision across the columella between the nostrils is the hallmark of one specific nasal operation that reshapes the external nose.

111. A man met with an RTA and came to the emergency department with complaint of back pain. No neurological deficit. X-ray spine done — what will be the diagnosis?



- (A) Fracture of spinous process
- (B) Compressed fracture
- (C) Fracture of base of vertebra
- (D) Chance fracture

Correct Answer: (D) Chance fracture

Solution:

Step 1: Set the clinical context. A road traffic accident (RTA) is a classic high-energy flexion-distraction mechanism — typically a seat-belted occupant thrown forward over a lap belt. The fulcrum is the anterior abdominal wall, so the spine fails in *distraction* (*pulling apart*) posteriorly while the anterior column may stay intact or compress only mildly.

Step 2: Why Chance fracture (Option D) is correct. A Chance fracture is a horizontal fracture that runs through the vertebral body, pedicles and spinous process — a transverse “seat-belt” injury caused by flexion-distraction. On the lateral X-ray it appears as a horizontal split widening posteriorly. It is a recognised RTA/seat-belt injury and can present with only back pain and no neurological deficit if the cord is spared, exactly as described.

Step 3: Why the other options are wrong.

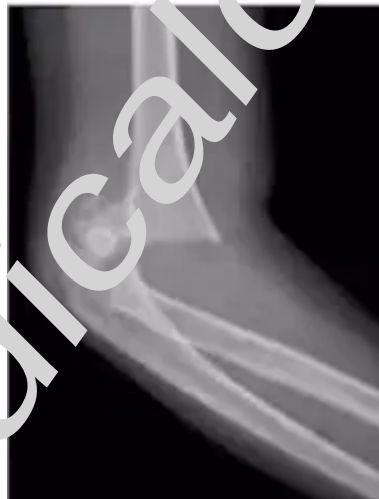
- **Fracture of spinous process (A)** is an isolated avulsion (e.g. clay-shoveller's fracture) and does not involve the body or pedicles through a horizontal plane.

- **Compression fracture (B)** is anterior wedging of the body from pure axial/flexion load; the posterior elements remain intact and there is no distraction — it does not match the seat-belt mechanism.
- **Fracture of base of vertebra (C)** is not a standard spinal fracture pattern and does not describe the horizontal through-and-through injury seen here.

Final answer: D (Chance fracture).

Quick Tip: Seat-belt + flexion-distraction over a lap belt produces a horizontal fracture across the whole vertebra — think of the eponymous “seat-belt fracture.”

112. What is the type of classification used for this fracture and its type?



- (A) Gartland type 3
- (B) Salter Harris type 3
- (C) Gartland type 4
- (D) Salter Harris type 4

Correct Answer: (A) Gartland type 3

Solution:

Step 1: Identify the fracture from the X-ray. The radiograph shows a fracture of the distal humerus above the elbow — a **supracondylar fracture of the humerus**, the commonest elbow fracture in children. Such fractures are graded

by the **Gartland classification**, which applies specifically to extension-type supracondylar humerus fractures.

Step 2: Why Gartland type 3 (Option A) is correct. The Gartland classification is:

- Type I — undisplaced.
- Type II — displaced with the posterior cortex (hinge) intact.
- Type III — completely displaced with no cortical contact.

The image shows a completely displaced supracondylar fracture with loss of cortical continuity, which corresponds to **Gartland type III**. This grade typically needs urgent reduction and K-wire fixation.

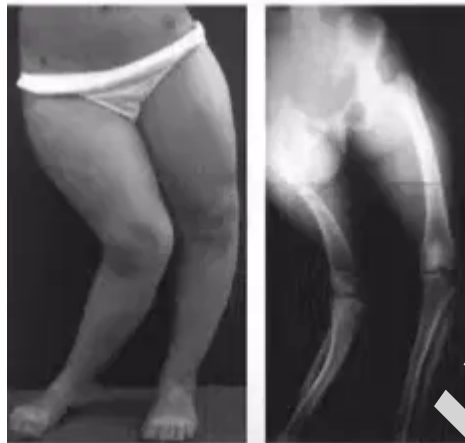
Step 3: Why the other options are wrong.

- **Salter–Harris type 3 (B) and type 4 (D)** classify *physeal (growth-plate) injuries*, not the supracondylar metaphyseal fracture shown; Salter–Harris is therefore the wrong classification system here.
- **Gartland type 4 (C)** is an uncommon variant (multidirectional instability, intact periosteal hinge lost circumferentially) and does not describe the standard completely displaced pattern in the image; the well-recognised completely-displaced grade is type III.

Final answer: A (Gartland type 3).

Quick Tip: A displaced distal-humerus fracture above the elbow in a child uses the eponymous supracondylar grading — a complete displacement is the highest common grade.

113. A child with this deformity. He has recurrent tooth abscesses. Calcium normal, Phosphorus low, PTH normal, ALP high. Diagnosis is?



- (A) Nutritional rickets
- (B) VDDR1
- (C) VDDR2
- (D) Hypophosphatemic rickets

Correct Answer: (D) Hypophosphatemic rickets

Solution:

Step 1: Read the biochemistry first. The decisive numbers are: *Calcium normal, Phosphorus low, PTH normal, ALP high*. Normal calcium with normal PTH but isolated **low phosphate** points to a primary renal phosphate-wasting disorder rather than a calcium/vitamin-D problem. The deformity (bowed legs / genu varum) plus a raised ALP confirms active rickets.

Step 2: Why Hypophosphatemic rickets (Option D) is correct. X-linked hypophosphatemic rickets (the commonest inherited rickets) is caused by excess **FGF23**, which makes the kidney waste phosphate. The pattern is therefore: *low serum phosphate, normal serum calcium, normal (not raised) PTH, and high ALP* from active bone turnover — an exact match. A characteristic clinical clue is **recurrent dental/periapical abscesses** due to defective dentine mineralisation and enlarged pulp chambers — again exactly as stated.

Step 3: Why the other options are wrong.

- **Nutritional (vitamin-D deficiency) rickets (A):** low vitamin D → low calcium

→ *secondary hyperparathyroidism*, so PTH would be **high**, not normal. PTH normal rules it out.

- **VDDR type 1 (B)**: deficiency of 1 α -hydroxylase → low calcitriol → low calcium → **high PTH**. Again PTH would be raised.

- **VDDR type 2 (C)**: end-organ vitamin-D receptor resistance → low calcium → **high PTH**, classically with alopecia. The normal PTH here excludes it.

Only hypophosphatemic rickets keeps calcium AND PTH normal while phosphate is low.

Final answer: D (Hypophosphatemic rickets).

Quick Tip: Normal calcium with normal PTH but low phosphate — plus recurrent dental abscesses — is a renal phosphate-wasting rickets, not a calcium/vitamin-D problem.

114. A 16-year-old boy claiming to be 18 years old. Which 2 joints should be checked for age estimation?

- (A) Wrist and knee
- (B) Hip and elbow
- (C) Hip and knee
- (D) Head and shoulder

Correct Answer: (A) Wrist and knee

Solution:

Step 1: Understand the principle. Forensic age estimation in the living near 16–18 years relies on the **radiological appearance and fusion of ossification (epiphyseal) centres**. Different epiphyses fuse at known ages, so choosing joints whose epiphyses fuse around 16–18 years gives the best discrimination at this age.

Step 2: Why Wrist and knee (Option A) is correct. At ~16–18 years the most

useful regions are the **wrist** and the **knee**:

- At the **wrist**, the lower (distal) ends of the radius and ulna fuse around 17–19 years — directly bracketing the disputed 16-vs-18 question.
- At the **knee**, the lower end of the femur and the upper end of the tibia/fibula fuse around 16–18 years.

Together these two joints contain epiphyses that are just fusing in the mid-to-late teens, so they are the classic pair for distinguishing a 16-year-old from an 18-year-old.

Step 3: Why the other options are wrong.

- **Hip and elbow (B)**: most elbow centres fuse earlier (around 14–17 years, many by 15–16) so the elbow is already largely fused and gives little discrimination at 16–18; the hip's iliac crest fuses later but the pairing is inferior to wrist+knee.
- **Hip and knee (C)**: the knee is useful but the hip alone is less precise than the wrist for the 16–18 window.
- **Head and shoulder (D)**: skull sutures and the medial clavicle fuse much later (clavicle into the 20s–30s) or are too variable, so they cannot resolve a 16-vs-18 dispute.

Final answer: A (Wrist and knee).

Quick Tip: Choose the two joints whose epiphyses are still fusing right in the 16–18-year window — the distal forearm and the joint just above the leg.

115. What is the device/implant shown in the following picture, used for femur neck fracture?



- (A) Condylar plate
- (B) Dynamic condylar screw
- (C) Dynamic hip screw
- (D) Locking plate

Correct Answer: (C) Dynamic hip screw

Solution:

Step 1: Identify the implant from the X-ray. The radiograph of the proximal femur shows a large lag screw passing up the femoral neck into the head, connected to a side plate fixed to the femoral shaft by cortical screws, with a barrel through which the lag screw can slide. This sliding-screw-and-plate construct is the **Dynamic Hip Screw (DHS)**.

Step 2: Why Dynamic Hip Screw (Option C) is correct. The DHS is the standard implant for extracapsular proximal femoral / femoral neck and intertrochanteric fractures. Its design allows the lag screw to telescope ("slide") within the barrel, producing **controlled compression (dynamisation)** at the fracture site during weight-bearing, which promotes union. The angle of the screw within the neck and the plate on the lateral shaft are characteristic and match the image.

Step 3: Why the other options are wrong.

- **Condylar plate (A)** (e.g. blade plate) is used for distal femur / condylar fractures, not the femoral neck, and has a fixed blade rather than a sliding neck screw.

- **Dynamic Condylar Screw (DCS) (B)** is essentially a DHS-type device angled for the *distal femur (supracondylar)* region, not the hip.
- **Locking plate (D)** is a plate with threaded screw holes giving fixed-angle stability; it does not have the single large sliding neck lag screw seen here.

Final answer: C (Dynamic Hip Screw).

Quick Tip: A big lag screw up the femoral neck joined to a side plate by a sliding barrel is the workhorse “sliding” hip implant.

116. Pain in back of leg and thigh after lifting heavy weight. Which segment involved?

- (A) L4
- (B) L5
- (C) L3
- (D) S1

Correct Answer: (B) L5

Solution:

Step 1: Identify the clinical picture. Pain that begins after lifting a heavy weight and radiates down the back of the thigh and leg is classic sciatica caused by a lumbar intervertebral disc prolapse compressing a lumbosacral nerve root. The most common levels for disc herniation are L4–L5 and L5–S1.

Step 2: Map the dermatome to the root. The L5 nerve root supplies the lateral aspect of the leg, the dorsum of the foot and the great toe, and pain referred along the posterior thigh and posterolateral leg is typical of L5 radiculopathy. The L5 root is the most frequently involved root in lifting-related disc prolapse (an L4–L5 disc herniation classically compresses the traversing L5 root).

Step 3: Why L5 (option B) is correct. Posterior thigh + leg pain after lifting fits an L4–L5 prolapse compressing the L5 root, the single most common root

affected by mechanical lifting injuries.

Step 4: Why the other options are wrong. L4 (option A) radiculopathy gives anteromedial leg pain with a depressed knee jerk and weak quadriceps, not posterior-thigh pain. L3 (option C) involvement causes anterior thigh pain and is uncommon in lifting injuries. S1 (option D) involvement causes pain down the posterior calf to the sole/lateral foot with a depressed ankle jerk and weak plantarflexion; while plausible, the classic answer for this presentation is L5.

Final answer: B (L5).

Quick Tip: Sciatica after lifting = posterolateral disc prolapse; the most commonly trapped root at L4–L5 is the traversing root.

117. Fracture base of 5th metatarsal, below knee cast should be worn for

- (A) 6-8 weeks
- (B) 2-3 weeks
- (C) 16-20 weeks
- (D) 3-5 weeks

Correct Answer: (A) 6-8 weeks

Solution:

Step 1: Understand the injury. An avulsion fracture of the base of the fifth metatarsal (a “pseudo-Jones”; or tuberosity avulsion injury) is the commonest metatarsal fracture, usually caused by sudden inversion of the foot which pulls the bone via the peroneus brevis tendon and lateral band of the plantar aponeurosis.

Step 2: Decide on management duration. Most undisplaced base-of-fifth-metatarsal fractures are treated with immobilisation in a below-knee walking cast or boot. The standard period of cast immobilisation to allow bony union is

approximately 6–8 weeks.

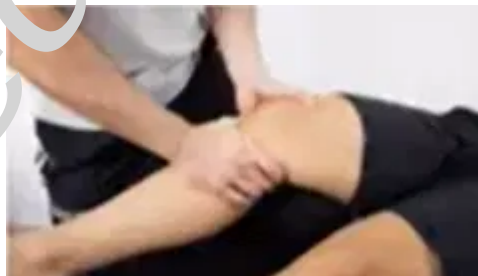
Step 3: Why option A (6–8 weeks) is correct. Six to eight weeks gives adequate time for callus formation and clinical/radiological union of an avulsion metaphyseal fracture at this site, after which the cast is removed and weight-bearing/mobilisation progressed.

Step 4: Why the other options are wrong. 2–3 weeks (option B) and 3–5 weeks (option D) are too short for reliable union and risk re-displacement or non-union. 16–20 weeks (option C) is far longer than required and would cause unnecessary stiffness and disuse atrophy.

Final answer: A (6–8 weeks).

Quick Tip: An avulsion fracture of cancellous bone with good blood supply heals in the standard fracture-union window, not weeks longer.

118. A football player had twist of the knee and ankle, clinically no bony injury was appreciated. Examiner is doing the test as shown her. Which test is this?



- (A) Ant drawer for acl
- (B) Post drawer pcl
- (C) McMurray
- (D) Lachman

Correct Answer: (D) Lachman

Solution:

Step 1: Read the clinical photo. The examiner is shown holding the patient's knee flexed to about 20–30 degrees, with one hand stabilising the lower thigh and the other gripping the upper calf to pull the tibia forward. This hand position with the knee in slight flexion is characteristic of the Lachman test.

Step 2: What the Lachman test assesses. The Lachman test is the most sensitive clinical test for an anterior cruciate ligament (ACL) tear. With the knee at 20–30 degrees flexion, the examiner pulls the tibia anteriorly; excessive anterior translation with a soft/absent endpoint indicates ACL deficiency.

Step 3: Why option D (Lachman) is correct. A twisting injury of the knee in a footballer that tears the ACL is examined with the knee in only slight (20–30 degree) flexion as shown — this is the Lachman position, more reliable than the anterior drawer because the hamstrings are relaxed.

Step 4: Why the other options are wrong. The anterior drawer test for the ACL (option A) is done with the knee flexed to 90 degrees and the foot fixed by the examiner sitting on it — not the position shown. The posterior drawer test for the PCL (option B) is also at 90 degrees but pushes the tibia backward. McMurray's test (option C) is for meniscal tears and involves rotating the tibia while extending the flexed knee, not an anteroposterior pull near full extension.

Final answer: D (Lachman).

Quick Tip: Knee held at only 20–30 degrees while pulling the tibia forward = the most sensitive ACL test, not the 90-degree drawer.

119. Fracture at which site will affect the longitudinal growth of the bone?

- (A) Epiphyseal plate
- (B) Epiphysis
- (C) Metaphysis
- (D) Diaphysis

Correct Answer: (A) Epiphyseal plate

Solution:

Step 1: Recall how long bones grow in length. Longitudinal (lengthwise) growth of a long bone occurs at the epiphyseal plate (physis or growth plate) — a layer of proliferating cartilage between the epiphysis and metaphysis where chondrocytes multiply and then ossify, progressively elongating the bone until skeletal maturity.

Step 2: Apply this to fracture. A fracture that crosses or damages the epiphyseal plate (a Salter-Harris injury in a child) can disturb this cartilage, causing premature physeal closure or asymmetric growth, and therefore growth arrest, limb shortening or angular deformity.

Step 3: Why option A (epiphyseal plate) is correct. Because the physis is the actual engine of longitudinal growth, only injury here threatens future lengthening of the bone.

Step 4: Why the other options are wrong. The epiphysis (option B) is the bone end that contributes to joint surface and articular growth, not the main length-generating zone. The metaphysis (option C) is the flared region adjacent to the physis where newly formed bone remodels, but it does not itself drive lengthening. The diaphysis (option D) is the shaft, which grows in width (appositional growth) via the periosteum, not in length. Fractures of these regions in children generally heal without affecting longitudinal growth.

Final answer: A (Epiphyseal plate).

Quick Tip: Length is added at the cartilage plate between epiphysis and metaphysis, the shaft only grows in width.

120. Patient not unable to make "OK" Sign. Which muscle is involved?

- (A) FDS
- (B) FDP
- (C) FIC

Correct Answer: (B) FDP

Solution:

Step 1: Understand the "OK" sign. Making the "OK" sign requires flexion of the distal interphalangeal (DIP) joint of the index finger and the interphalangeal (IP) joint of the thumb so their pulps oppose to form a rounded "O". Inability to do this and forming a flattened pinch is the classic sign of anterior interosseous nerve (AIN) palsy.

Step 2: Identify the muscle needed. The anterior interosseous nerve supplies flexor pollicis longus (FPL), flexor digitorum profundus (FDP) to the index (and middle) finger, and pronator quadratus. DIP-joint flexion of the index finger is produced specifically by the flexor digitorum profundus.

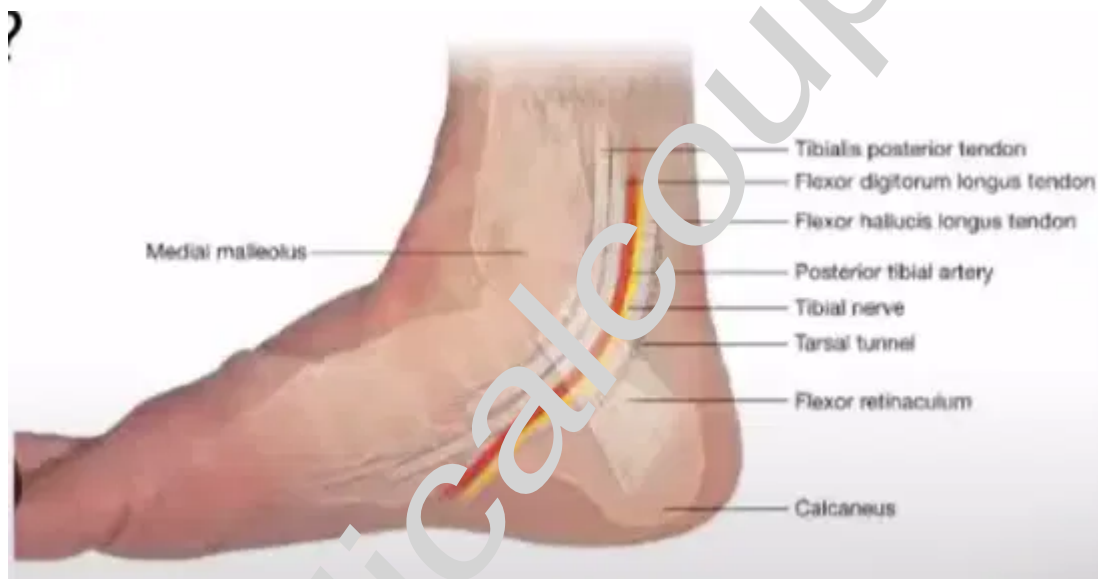
Step 3: Why option B (FDP) is correct. Loss of distal flexion of the index finger — needed to round the fingertip in the "OK" sign — is due to weakness of the flexor digitorum profundus (together with FPL); among the listed options FDP is the muscle responsible for index DIP flexion.

Step 4: Why the other options are wrong. Flexor digitorum superficialis (FDS, option A) flexes the proximal interphalangeal (PIP) joint, not the DIP, so it cannot account for the failed "OK" sign. "FIC" (option C) is not a muscle that controls index DIP flexion. Option D is not a valid muscle.

Final answer: B (FDP).

Quick Tip: The “OK” sign needs the fingertip (distal) joint to bend, which long flexor reaches the distal phalanx of the index finger?

121. Artery passing between medial malleolus and the Achilles tendon?



- (A) Posterior tibial artery
- (B) Anterior tibial artery
- (C) Dorsalis pedis artery
- (D) Peroneal (fibular) artery

Correct Answer: (A) Posterior tibial artery

Solution:

Step 1: Recall the structures behind the medial malleolus. The region between the medial malleolus and the calcaneal (Achilles) tendon contains the tarsal tunnel. The contents from anterior to posterior follow the mnemonic “Tom, Dick And Very Nervous Harry”: Tibialis posterior tendon, flexor Digitorum longus tendon, posterior tibial Artery, posterior tibial Vein, tibial Nerve, flexor Hallucis longus tendon.

Step 2: Identify the artery. The artery running here, midway between the medial malleolus and the Achilles tendon, is the posterior tibial artery – this is exactly where its pulse is palpated.

Step 3: Why option A (posterior tibial artery) is correct. The posterior tibial artery passes behind the medial malleolus within the tarsal tunnel to enter the sole, where it divides into the medial and lateral plantar arteries.

Step 4: Why the other options are wrong. The anterior tibial artery (option B) runs down the front of the leg and becomes the dorsalis pedis (option C) on the dorsum of the foot – neither passes behind the medial malleolus. The peroneal (fibular) artery (option D) lies in the lateral/posterior compartment near the fibula and does not occupy the tarsal tunnel behind the medial malleolus.

Final answer: A (Posterior tibial artery)

Quick Tip: Use the tarsal-tunnel mnemonic Tom-Dick-And-Very-Nervous-Harry; the “A” is the artery you feel for the foot pulse.

122. A child, left femur shaft fracture, managed by plating. What type of callus formation?

- (A) Creeping substitution
- (B) Primary callus
- (C) Secondary callus

Correct Answer: (B) Primary callus

Solution:

Step 1: Recall the two modes of fracture healing. Bone heals either by secondary (indirect) healing – with abundant visible callus, when there is some

interfragmentary movement (e.g. cast or intramedullary nail) — or by primary (direct) healing, with little or no external callus, when the fragments are rigidly fixed and anatomically compressed.

Step 2: Apply the fixation method. A femoral shaft fracture treated by plating uses rigid internal fixation with a compression/locking plate that holds the fragments under absolute stability. Under rigid fixation, bone unites by primary (direct) bone healing through Haversian remodelling, producing primary callus with minimal external callus.

Step 3: Why option B (primary callus) is correct. Rigid plate fixation gives absolute stability → direct (primary) bone healing → primary callus, without the bulky bridging callus seen in non-rigid fixation.

Step 4: Why the other options are wrong. Secondary callus (option C) forms when there is micromotion (cast, brace or intramedullary nailing), not after rigid plating. "Creeping substitution" (option A) describes the gradual replacement of dead/necrotic bone or a graft by new bone (as in avascular necrosis or bone grafting), not the callus type produced by plating a fresh fracture. Option D is not a valid choice.

Final answer: B (Primary callus).

Quick Tip: Rigid (absolute-stability) fixation heals directly with minimal external callus; micromotion heals with bulky bridging callus.

123. A chondrosarcoma tumor, probably small round blue cells. Which test/translocation is useful for diagnosis?

(A) t(11;22)

(B) t(15;17)

(C) —

Correct Answer: (A) t(11;22)

Solution:

Step 1: Identify the lesion. A tumor arising in the **diaphysis** (mid-shaft) of a long bone that is composed of **small round blue cells** on histology is the classic description of **Ewing sarcoma** (a member of the Ewing sarcoma family of tumors / primitive neuroectodermal tumor, PNET). Small round blue cell tumors are so named because the cells are small, uniform, have scant cytoplasm and large hyperchromatic (blue-staining) nuclei on H&E.

Step 2: Recall the defining molecular marker. Ewing sarcoma is defined by the reciprocal translocation **t(11;22)(q24;q12)**, which fuses the *EWSR1* gene on chromosome 22 with the *FLI1* gene on chromosome 11, producing the EWS-FLI1 fusion oncoprotein. Detecting this translocation (by FISH or RT-PCR) is the most useful confirmatory test, so option (a) **t(11;22)** is correct.

Step 3: Why the distractor is wrong. Option (b) **t(15;17)** is the translocation of **acute promyelocytic leukemia (APL; AML-M3)** — it fuses *PML* (chr 15) with *RARA* (chr 17) and has nothing to do with a bone tumor. It is therefore incorrect.

Final answer: Option a — **t(11;22)**.

Quick Tip: "Small round blue cell" tumor of the bone diaphysis in a young patient — think of the EWS-FLI1 fusion.

124. What is the level of amputation shown here?



- (A) Below Knee Amputation
- (B) Above Knee Amputation
- (C) Syme's amputation
- (D) Hip disarticulation

Correct Answer: (A) Below Knee Amputation

Solution:

Step 1: Read the clinical photograph. The image shows a residual limb (stump) being dressed/bandaged in which the **knee joint is preserved** and the amputation has been performed through the **leg (tibia and fibula) below the knee**. The stump ends in the upper-to-mid leg region with the knee intact above it.

Step 2: Classify the amputation. When the section passes through the tibia/fibula and the knee is retained, the procedure is a **Below Knee Amputation (BKA)**, also called a trans-tibial amputation. The ideal trans-tibial level is about 12–15 cm distal to the knee joint line, which preserves enough length for prosthetic fitting while keeping a viable myocutaneous (posterior flap) cover.

Step 3: Why this level matters / why other levels are not shown. A BKA is functionally superior to an above-knee amputation because retaining the knee joint dramatically reduces the energy cost of walking with a prosthesis. An **Above Knee (trans-femoral)** amputation would section the femur and the knee would be absent – not the case here. A **Syme's** amputation is performed at the

ankle (the stump would be at the ankle level), and a **hip disarticulation** removes the entire lower limb at the hip — neither matches the picture.

Final answer: Below Knee Amputation.

Quick Tip: The knee joint is still present and the cut is through the leg bones — name the trans-tibial level.

125. A 40-year-old RTA case is brought to casualty & declared brought dead by Dr. The Dr informs police official & sends body to mortuary. Autopsy in this case will be conducted on request of

- (A) PP (Public Prosecutor)
- (B) Defence lawyer
- (C) Dr
- (D) Investigating officer

Correct Answer: (D) Investigating officer

Solution:

Step 1: Classify the case. A 40-year-old victim of a **road traffic accident (RTA)** brought dead is an **unnatural / medico-legal death**. By law such deaths must be reported to the police and a **medico-legal (forensic) autopsy** is required to establish the cause and manner of death.

Step 2: Recall who can order a medico-legal autopsy. A medico-legal post-mortem examination is NOT done on the request of relatives or doctors. It is conducted only on the **written requisition of a legally authorized investigating authority** — the **Investigating Officer (the police officer, usually of or above the rank of sub-inspector) or a Magistrate**. The doctor performs the autopsy after receiving this requisition together with the inquest papers. Hence option (D) Investigating officer is correct.

Step 3: Why the other options are wrong.

• (A) **Public Prosecutor** represents the State in court but does not order autopsies. Wrong.

• (B) **Defence lawyer** represents the accused and has no authority to requisition a post-mortem. Wrong.

• (C) **Doctor** conducts the autopsy but cannot start it on his own initiative; he/she requires the police/magistrate requisition. (A doctor may request a clinical/pathological autopsy with consent of relatives, but a medico-legal autopsy of an RTA death needs the investigating authority's order.) Wrong.

Final answer: Option D – Investigating officer.

Quick Tip: A medico-legal autopsy in an RTA death is ordered by the police/magistrate, not by relatives or the doctor.

126. A 30-year-old male dead body was brought to autopsy. The Dr notices greyish white waxy material with preserved facial features. Which is true of following change

- (A) High temperature needed
- (B) Hot & dry environment needed
- (C) Starts very early after death
- (D) It is a form of body preservation by saponification of fats

Correct Answer: (D) It is a form of body preservation by saponification of fats

Solution:

Step 1: Identify the post-mortem change. A greyish-white, waxy / soapy material with preservation of facial (and other) features in a dead body is the classic description of **adipocere** (also called grave-wax). It is one of the modifications of putrefaction that preserve the body and so help in identification.

Step 2: Understand the mechanism. Adipocere forms by **hydrolysis and hydrogenation of the body's fats**, converting neutral fats into a mixture of

saturated fatty acids and their salts (soaps) — i.e. a **saponification** process. The enzymes are bacterial (mainly *Clostridium perfringens* lecithinase) plus endogenous lipases. This makes option (D) — "a form of body preservation by saponification of fats" — the correct statement.

Step 3: Why the other options are wrong.

• **(A) High temperature needed** — false. A moderately warm temperature helps, but extreme heat is not required; adipocere classically forms in **moist, damp conditions** (water, wet soil), not in dry heat.

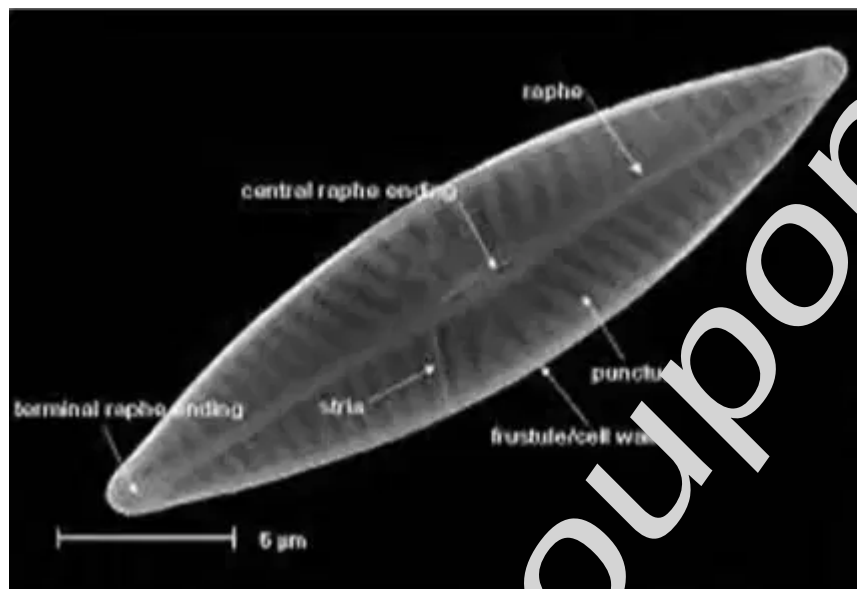
• **(B) Hot & dry environment needed** — false. That describes the conditions for **mummification**, the opposite environment. Adipocere needs **moisture**.

• **(C) Starts very early after death** — false. Adipocere takes time — it begins to be appreciable only after about **3 weeks** and is well-formed over several months. It is not an early change.

Final answer: Option D — **It is a form of body preservation by saponification of fats.**

Quick Tip: Greyish-white waxy "grave-wax" with preserved features = adipocere, formed by saponification of fat in moist conditions.

127. The microscopic image of organism was analyzed in a drowning case. Which is correct about them



- (A) Contains silica & chlorophyll point
- (B) Are microscopic unicellular bacteria
- (C) Present only in bone marrow
- (D) Are not resistant to acids & heat

Correct Answer: (A) Contains silica & chlorophyll point

Solution:

Step 1: Identify the organism. The microscopic image in a **drowning** case showing an elongated, boat/spindle-shaped structure with an ornamented, symmetrically patterned shell (frustule) is a **diatom**. The **diatom test** is a classic forensic investigation used to support a diagnosis of antemortem drowning — diatoms inhaled/swallowed with water enter the circulation and are deposited in organs such as the bone marrow, lungs, liver and kidney.

Step 2: Recall the biology of diatoms. Diatoms are **unicellular photosynthetic algae**. Two key features: (i) they possess **chlorophyll** (hence they are photosynthetic, found in natural water bodies), and (ii) their cell wall (frustule) is made of **silica (silicon dioxide)**. Because the wall is silica, diatoms are **highly resistant to acids and heat** — this is exactly why acid-digestion of tissues is used to recover them in the diatom test. Thus the true statement is option (A):

they contain **silica and chlorophyll**.

Step 3: Why the other options are wrong.

- **(B) Microscopic unicellular bacteria** – false; diatoms are **eukaryotic algae (protists)**, not bacteria.
- **(C) Present only in bone marrow** – false; in drowning, diatoms are found in many organs (lung, liver, kidney, brain, bone marrow). Bone marrow is a preferred site for the test (its remoteness reduces contamination) but they are not present "only" there, and in nature diatoms live in water, not in marrow.
- **(D) Not resistant to acids & heat** – false; the silica frustule makes diatoms **resistant to strong acids and heat**, which is the very basis of the acid-digestion recovery technique.

Final answer: Option A – Contains silica & chlorophyll.

Quick Tip: Diatoms in a drowning case are silica-walled, chlorophyll-bearing algae – acid- and heat-resistant, which is why the diatom test works.

128. The range of fire by a rifled firearm per the image



- (A) Contact
- (B) Close
- (C) Distant
- (D) Cannot be opined

Correct Answer: (B) Close

Solution:

Step 1: Read the wound morphology. The photograph shows a central circular entry wound surrounded by a fairly dense zone of reddish-brown discrete spots (tattooing / stippling) scattered over several centimetres of skin around the hole. Tattooing is the abrasion-and-embedding of partly burnt and unburnt gunpowder grains into the skin; it cannot be wiped off.

Step 2: Link range to the surrounding marks. In firearm wounds, the range of fire is estimated from which secondary marks accompany the entry hole:

- Contact / near-contact: muzzle imprint, blackening of seared wound margins, cherry-red carboxyhaemoglobin discolouration, and cavitation – powder is driven inside the wound.
- Close (intermediate) range: a zone of tattooing (stippling) around the wound, with or without scorching/blackening, because individual powder grains travel only a limited distance and embed in skin.
- Distant range: only the entry hole with an abrasion collar; no tattooing, scorching or blackening, since powder grains fall short of the target.

Step 3: Apply to this image. The presence of a clear ring of tattooing around the entry wound, without features of contact firing, places this within the intermediate or **close** range of fire. For a rifled weapon, tattooing is generally seen up to roughly **60 cm** (about 2 feet); its presence here indicates close range.

Step 4: Eliminate the distractors. Contact (A) would show muzzle imprint, charring and internal soot, none of which are the dominant feature. Distant (C) would show only a clean hole with abrasion collar and NO tattooing – contradicted by the obvious stippling. 'Cannot be opened' (D) is wrong because the tattooing is a reliable, opinable sign of range.

Final answer: B – Close range.

Quick Tip: Powder grains embedded around the hole (tattooing that cannot be wiped off) without a muzzle imprint or charring point to one specific range.

129. A pregnant female comes to a gynecologist who sends her for USG. On USG twin pregnancy noted with about one month difference in age of fetuses. Which is true of following

- (A) Superfetation
- (B) Superfecundation
- (C) Suppositious child
- (D) Posthumous child

Correct Answer: (A) Superfetation

Solution:

Step 1: Identify the key finding. The ultrasound shows two fetuses that differ in gestational age by about one month. The question is which medico-legal term explains two co-existing fetuses of clearly DIFFERENT ages in the same uterus.

Step 2: Define the terms.

- **Superfetation:** Fertilisation of a SECOND ovum and implantation of a second embryo when a pregnancy already exists, i.e. conception in two different menstrual cycles. The two fetuses therefore differ in age by about a month – exactly what the scan shows.
- **Superfecundation:** Fertilisation of TWO ova released in the SAME cycle by sperm from two separate acts of coitus (often two different men). Both fetuses are of the SAME age – they do not differ by a month.
- **Suppositious child:** A medico-legal fraud where a child is falsely passed off as having been born to a woman who was never pregnant (pretended delivery). It is not about twin ages.
- **Posthumous child:** A child born after the death of its father (born from a pregnancy already established before the father died). Not about age difference between twins.

Step 3: Match to the scenario. A difference of roughly one month in fetal age means the two ova were fertilised in two different menstrual cycles → this is the definition of superfetation.

Step 4: Eliminate distractors. Superfecundation (B) gives same-aged twins, so it is wrong. Suppositious child (C) and posthumous child (D) deal with parentage/legitimacy fraud and timing of birth relative to the father's death, not the age gap between twins.

Final answer: A – Superfetation.

Quick Tip: Two fetuses one month apart in age means the second ovum was fertilised in a later menstrual cycle – which single term describes that?

130. The findings in image is suggestive of which poisoning



- (A) OPC
- (B) Arsenic
- (C) Lead
- (D) Mercury

Correct Answer: (B) Arsenic

Solution:

Step 1: Read both images. The first photograph shows a fingernail crossed by transverse white bands (Mees' lines / leukonychia striata). The second shows the palms with marked hyperkeratosis and scaly/desquamating, pigmented skin. These are the classic dermatological signs of chronic heavy-metal toxicity.

Step 2: Match the signs to the metal. Chronic **arsenic** poisoning characteristically produces:

- **Mees' lines** – transverse white bands across the nails appearing weeks after exposure (the most specific nail sign of arsenic);
- **Palmoplantar hyperkeratosis** – wart-like thickening of palms and soles;
- **'Raindrop' (raindrop) pigmentation** – hyperpigmentation with spots of

normal skin.

The nail banding plus thick scaly hyperpigmented palms in the image fit arsenic.

Step 3: Eliminate the distractors.

- **OPC (organophosphate, A):** Acute cholinergic crisis – miosis, salivation, lacrimation, bronchorrhoea, fasciculations; it does NOT cause Mees' lines or palmar hyperkeratosis.
- **Lead (C):** Burton's blue line on the gum margin, basophilic stippling of RBCs, wrist/foot drop, lead colic, lead encephalopathy – not transverse nail bands with palmar keratosis.
- **Mercury (D):** Acrodynia (pink disease), tremor, erethism, gingivostomatitis and salivation; nail Mees' lines and palmoplantar hyperkeratosis are not its hallmark.

Step 4: Conclude. Transverse white nail bands (Mees' lines) together with hyperkeratotic, pigmented palms are pathognomonic of chronic arsenic toxicity.

Final answer: B – Arsenic.

Quick Tip: Transverse white nail bands (Mees' lines) plus thick, pigmented, scaly palms point to one chronic heavy metal poison.

131. Many people have consumed contaminated alcohol and present with abdominal pain, confusion, decreased vision. Methyl alcohol conc detected as 20 mg %. On assessment which metabolites will be found

- (A) Formic acid & lactic acid
- (B) Glycolic acid & oxalic acid
- (C) Oxalic acid & formic acid
- (D) Glyoxylic acid & formic acid

Correct Answer: (A) Formic acid & lactic acid

Solution:

Step 1: Identify the toxin and clinical picture. A cluster of people drinking contaminated (illicit) alcohol with abdominal pain, confusion and decreased vision, plus a measured methyl alcohol (methanol) level of 20 mg% = methanol poisoning. The visual loss is the hallmark.

Step 2: Recall the metabolic pathway of methanol. Methanol is oxidised in the liver:



The toxic end-metabolite is **formic acid (formate)**, which inhibits cytochrome oxidase, damages the optic nerve/retina and produces a severe high-anion-gap metabolic acidosis.

Step 3: Account for the second acid. The accumulating formate impairs mitochondrial respiration; tissue hypoxia and anaerobic glycolysis then generate **lactic acid**. So both formic acid and lactic acid build up and together drive the high-anion-gap acidosis seen in methanol poisoning. Hence the metabolites detected are formic acid and lactic acid.

Step 4: Eliminate the distractors. Glycolic acid and oxalic acid (B), oxalic acid and formic acid (C) and glyoxylic acid and formic acid (D) all involve glycolic/oxalic/glyoxylic acids – these are products of ETHYLENE GLYCOL metabolism, not methanol. Ethylene glycol is metabolised through glycolaldehyde → glycolic acid → glyoxylic acid → oxalic acid (causing calcium-oxalate crystals and renal failure). Since the toxin here is methanol, oxalic/glycolic/glyoxylic acids do not apply.

Final answer: A – Formic acid & lactic acid.

Quick Tip: Methanol → formaldehyde → formic acid; the resulting mitochondrial block also raises one more common acid. (Oxalic/glycolic acids belong to ethylene

132. A person comes to emergency after consumption of substance, the form & dose of which is not known to relatives. The patient shows tachypnea, hypotension. On metabolic assessment high anion gap acidosis is noted with hypocalcaemia. Diagnosis

- (A) Methyl alcohol
- (B) Ethylene glycol
- (C) Dhatura
- (D) Ethyl alcohol

Correct Answer: (B) Ethylene glycol

Solution:

Step 1: List the discriminating findings. The patient has (i) an unknown ingested substance, (ii) tachypnoea and hypotension, (iii) a HIGH ANION GAP metabolic acidosis and – the key clue – (iv) **hypocalcaemia**.

Step 2: Use hypocalcaemia to localise the toxin. Among the options, the toxin that classically combines high anion-gap acidosis WITH hypocalcaemia is **ethylene glycol**. Ethylene glycol is metabolised to glycolic acid (causing the high anion gap acidosis) and then to **oxalic acid**, which binds serum calcium to form insoluble calcium oxalate. This chelation drops the serum calcium (hypocalcaemia) and the calcium-oxalate crystals deposit in renal tubules, causing acute kidney injury. Tachypnoea is the respiratory compensation for acidosis; hypotension reflects the toxic/metabolic decompensation.

Step 3: Eliminate the distractors.

- **Methyl alcohol (A):** Also causes a high anion gap acidosis, but its hallmark is VISUAL loss from formic acid, and it does NOT characteristically cause hypocalcaemia.
- **Dhatura (C):** An anticholinergic plant poison – dry mouth, dilated pupils, hot dry flushed skin, delirium, tachycardia; it does not produce high-anion-gap

acidosis with hypocalcaemia.

- **Ethyl alcohol (D):** Ordinary alcohol; can cause a mild ketoacidosis but not the calcium-oxalate hypocalcaemia picture, and it is the antidote (competitor for alcohol dehydrogenase) rather than the cause here.

Step 4: Conclude. High anion gap metabolic acidosis PLUS hypocalcaemia (from calcium-oxalate formation) points specifically to ethylene glycol.

Final answer: B – Ethylene glycol.

Quick Tip: High anion gap acidosis is non-specific – but acidosis PLUS hypocalcaemia (calcium being chelated by oxalate) points to one alcohol.

133. 36 yr - G4L3P3- FULL TERM PREG Labor arrested at 8cm cervical dilation. EM CS done after counselling patient. Baby alive but intractable PPH. EM HYSTERECTOMY done to save life of mother

- (A) C
- (B) P
- (C) T
- (D) T

Correct Answer: (A), C

Solution:

Step 1: Restate the scenario. A 36-year-old, G4L3P3, at full term has labour arrested at 8 cm dilatation (arrest in the first stage). An emergency caesarean section is done after counselling the patient; the baby is delivered alive, but the mother develops intractable postpartum haemorrhage (PPH) and an emergency obstetric (peripartum) hysterectomy is performed to save her life. The single-letter options (C, P, T, T) ask how this event is to be classified.

Step 2: Interpret the options. In a maternal outcome / cause-of-death style

classification the letters denote categories such as **C – (direct obstetric, e.g. caesarean / coincidental?)**, **P – puerperal** and **T – (others)**. Here the adverse event – intractable PPH leading to emergency hysterectomy – arises directly from the pregnancy and its management (operative delivery and atonic/traumatic haemorrhage), i.e. it is a **direct, pregnancy-related** event, which corresponds to the keyed category C.

Step 3: Reasoning for the keyed answer. The morbidity is causally and temporally tied to the pregnancy and delivery (it occurred during the operative/peripartum period as a direct complication) so it is categorised under option C – the direct, pregnancy-attributable category, as keyed.

Step 4: Why the others are not chosen. The remaining letters (P and the two T options) represent the alternative outcome categories that do not fit a directly pregnancy-caused, intra-/peri-operative life-saving hysterectomy as cleanly as the keyed option. They would apply to events that are puerperal-period or unrelated/other categories rather than the direct obstetric haemorrhagic emergency described.

Final answer: A – C (as per the official key).

Quick Tip: The complication (intractable PPH after emergency CS, needing life-saving hysterectomy) is a **DIRECT** pregnancy-related event – classify it accordingly per the key.

134. A 30-year-old female abuser with suicidal tendency brought to hospital.
Mydriasis, tachypnea, tachycardia +. Diagnosis

- (A) Cocaine
- (B) Morphine
- (C) Heroin
- (D) Chlorpheniramine

Correct Answer: (A) Cocaine

Solution:

Step 1: Build the toxidrome. The drug abuser presents with **mydriasis** (dilated pupils), **tachypnoea** (fast breathing) and **tachycardia** (fast heart rate). This triad of pupillary dilatation plus sympathetic/cardiorespiratory stimulation is a **sympathomimetic** toxidrome.

Step 2: Match the toxidrome to the drug. Among the options, **cocaine** is the classic sympathomimetic stimulant: by blocking re-uptake of dopamine, noradrenaline and serotonin it produces mydriasis, tachycardia, hypertension, tachypnoea, hyperthermia and agitation. This fits the patient perfectly.

Step 3: Eliminate the opioids.

- **Morphine (B)** and **Heroin (C)** are opioids and cause the OPPOSITE picture – the opioid toxidrome of **pinpoint pupils (miosis)**, **respiratory DEPRESSION (bradypnoea)** and **bradycardia/sedation**. They cannot explain mydriasis with tachypnoea/tachycardia.

Step 4: Eliminate the antihistamine. **Chlorpheniramine (D)** is a first-generation H1 antihistamine with anticholinergic effects. Although it can dilate pupils and cause tachycardia, its classic picture is the **ANTICHOLINERGIC** toxidrome (dry mouth, hot dry flushed skin, urinary retention, delirium, often with respiratory depression in overdose, rather than the pure sympathomimetic stimulant pattern; the best single fit for mydriasis + tachypnoea + tachycardia in a drug abuser is cocaine).

Final answer: A – Cocaine.

Quick tip: Mydriasis + tachypnoea + tachycardia = a sympathomimetic toxidrome – the opposite of the opioid (pinpoint pupil, slow breathing) picture.

135. MTP in 21-year-old, 10-week pregnancy is to be done by medical methods using

- (A) Intra uterine hyperosmotics
- (B) Dinoprostone
- (C) Oxytocin infusion
- (D) M + M

Correct Answer: (D) M + M

Solution:

Step 1: Define the clinical task. A 21-year-old with a 10-week (first-trimester, $\leq 9-10$ weeks) pregnancy is to have a MEDICAL (drug-induced) termination of pregnancy. We must choose the standard medical-abortion regimen for early pregnancy.

Step 2: Recall the recommended regimen. The WHO/FOGSI-endorsed first-line medical abortion regimen up to 9–10 weeks is the combination of **Mifepristone followed by Misoprostol** – i.e. **M + M**. Mifepristone is an antiprogesterone that detaches the pregnancy and sensitises the uterus, and misoprostol (a prostaglandin E1 analogue) given 24–48 hours later induces uterine contractions and expulsion. This is the most effective and standard medical method for first-trimester MTP.

Step 3: Eliminate the distractors.

- **Intra-uterine hyperosmotics (A)** (e.g. intra-amniotic hypertonic saline / urea) are used for SECOND-trimester instillation abortion, not for a 10-week pregnancy.
- **Dinoprostone (B)** is prostaglandin E2, used mainly for cervical ripening / second-trimester termination and labour induction, not as the standard first-trimester medical abortion drug.
- **Oxytocin infusion (C)** is ineffective for first-trimester abortion because the early uterus has very few oxytocin receptors; oxytocin is used in later pregnancy/labour.

Step 4: Conclude. For a 10-week medical MTP the regimen is mifepristone plus misoprostol (M + M).

Final answer: D – M + M.

Quick Tip: First-trimester ($\leq 9-10$ wk) medical abortion uses an antiprogesterone followed by a prostaglandin – think of the 'M + M' pair.

136. A 22 weeks of gestation unmarried 14-year-old girl, who is rape victim comes at your clinic medical termination. What is true for medical abortion?

- (A) MTP can be done in rape victim till 24 wks.
- (B) Only one Doctor opinion required
- (C) Only done if risk of life
- (D) MTP can be done after permission of medical board

Correct Answer: (A) MTP can be done in rape victim till 24 wks.

Solution:

Step 1: Identify the legal framework. Termination of pregnancy in India is governed by the Medical Termination of Pregnancy (MTP) Act, as amended in 2021. We must apply it to a 14-year-old, unmarried, rape-victim girl at 22 weeks of gestation. (The page does not print an answer key for this item, so the correct option is derived from the current MTP rules.)

Step 2: Apply the gestational limits. Under the MTP (Amendment) Act 2021, the upper gestational limit is raised to **24 weeks** for special categories of women, which explicitly include **survivors of rape/sexual assault and minors**. A 14-year-old rape victim therefore falls squarely in the category for whom MTP is lawfully permitted up to 24 weeks. Hence option A – 'MTP can be done in rape victim till 24 wks' – is the correct, legally accurate statement.

Step 3: Examine the other options.

- **'Only one Doctor opinion required' (B):** For pregnancies BETWEEN 20 and 24 weeks (as here, 22 weeks) the opinion of **TWO** registered medical

practitioners is required (one RMP suffices only up to 20 weeks). So B is FALSE for a 22-week pregnancy.

- **'Only done if risk of life' (C):** This is too restrictive; MTP for a rape victim is permitted on the recognised grounds (grave injury to mental health, pregnancy from rape is presumed to constitute grave mental injury) and is NOT limited to risk to life alone. So C is FALSE.

- **'MTP can be done after permission of medical board' (D):** A Medical Board's approval is required ONLY for termination BEYOND 24 weeks (in cases of substantial fetal abnormality). At 22 weeks a Medical Board is not the prerequisite. So D is FALSE for this gestation.

Step 4: Conclude. The legally true statement for this 24-year-old rape survivor at 22 weeks is that MTP can be carried out in a rape victim up to 24 weeks.

Final answer: A – MTP can be done in rape victim till 24 wks.

Quick Tip: Under the MTP Amendment Act 2021, rape survivors and minors get an extended 24-week limit – but 20–24 weeks needs two RMPs, and a Medical Board is only for beyond 24 weeks.

137. This is seen in postmortem examination of which type of asphyxia:



- (A) Strangling
- (B) Smothering
- (C) Hanging
- (D) Garroting

Correct Answer: (B) Smothering

Solution:

Step 1: Understand the question. The clinical photograph is a postmortem finding of the face and mouth region. We must identify which mechanical asphyxial death produces these findings. Mechanical asphyxia is grouped by the site/mechanism of airway obstruction: smothering (closure of external nose and mouth openings), throttling (manual strangulation of the neck), hanging and garrotting (ligature/cord around the neck).

Step 2: Define smothering. Smothering is the mechanical occlusion of the external respiratory orifices (nose and mouth) by a hand, soft material (pillow, cloth) or other object. Because the assailant presses over the mouth and nose, the characteristic postmortem signs are located around the lips, nostrils and inner aspect of the cheeks: abrasions and pressure marks around the nose and mouth, contusions/bruising of the lips, and lacerations or contusions of the inner surface of the lips and gums caused by pressure of the lips against the teeth. The depicted facial/perioral injuries match this pattern, so the answer is **Smothering**.

Step 3: Why the other options are wrong.

(A) Throttling (manual strangulation) shows signs on the *neck* – crescentic fingernail abrasions, finger tip (disc-shaped) bruises over the neck, and fracture of the hyoid bone or thyroid cartilage – not perioral injuries.

(C) Hanging produces an obliquely placed, non-continuous ligature mark high on the neck above the thyroid, dribbling of saliva, and signs of suspension; the face does not show the perioral pressure injuries seen here.

(D) Garrotting (strangulation by a cord/ligature tightened from behind, often with a rod) produces a horizontal, low, continuous ligature mark around the neck, again a neck finding rather than a mouth finding.

Final answer: B – Smothering.

Quick Tip: Where are the injuries – around the mouth/nose or on the neck? Perioral pressure marks point to closure of the external air passages.

138. A G5P4 woman comes for routine sonography for the first time, she has early four daughters and wants to have a boy this time and asks for sex determination. To abide by the above depicted guidelines, what will you choose:

- (A) Will check routine ANC and sex for developmental ABN and do not reveal gender to patient
- (B) Will check routine ANC and sex for developmental ABN and do reveal gender to patient
- (C) Do reveal gender if a girl
- (D) Check only routine ANC, do not check sex

Correct Answer: (A) Will check routine ANC and sex for developmental ABN and do not reveal gender to patient

Solution:

Step 1: Identify the governing law. In India, prenatal sex determination and disclosure are regulated by the Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, 1994 \u2014 the PC-PNDT Act. Its purpose is to prevent female infanticide and the falling sex ratio. The woman here is explicitly requesting sex determination so she can have a boy, which is precisely the sex-selective demand the Act prohibits.

Step 2: What the law permits and forbids. The Act *allows* prenatal diagnostic procedures (ultrasonography, etc.) when there is a valid medical indication \u2014 to detect chromosomal/genetic disorders, congenital malformations and other fetal developmental abnormalities. The Act *strictly forbids* communicating the sex of the fetus to the pregnant woman, her relatives or any other person by word, signs or any other manner. Therefore the correct conduct is to perform the routine antenatal scan and look for developmental/structural abnormalities, but **not** reveal the gender to the patient.

Step 3: Why the other options are wrong.

(B) Revealing the gender to the patient directly violates the PC-PNDT Act and is a punishable offence.

(C) Revealing the sex 'if a girl' (or in any conditional manner) is still disclosure of fetal sex and is equally prohibited; it would in fact facilitate sex-selective abortion.

(D) Refusing to do the ultrasound sex/abnormality check altogether is wrong, because a medically indicated antenatal scan to look for fetal anomalies is legitimate and should not be withheld; the Act bans sex disclosure, not the scan itself.

Final answer: A \u2014 Do the routine ANC scan, screen for developmental abnormalities, and do not reveal the gender to the patient.

Quick Tip: Recall the PC-PNDT Act, 1994 \u2014 the antenatal scan is allowed, but disclosing fetal sex is a crime.

139. A child was born after the death of his father. Some of them claimed that the child is not from his biological father. DNA fingerprinting was done to identify the father, and the dead father was found to be the biological father. This child is called as:

- (A) Posthumous child
- (B) Suppositious child
- (C) Illegitimate child
- (D) Posthumous child

Correct Answer: (A) Posthumous child

Solution:

Step 1: Read the key fact. The decisive detail is that the child was *born after the death of his father*, and DNA fingerprinting confirmed the dead man was indeed the biological father. We must give the medico-legal term for a child born after the father's death.

Step 2: Define the correct term. A **posthumous child** is a child born after the death of its father. ('Posthumous' literally means 'after death/burial'.) Such a child

is legitimate provided it is born within the normal period of gestation after the father's death \u2014 the law recognises a maximum 'posthumous' gestation window (up to about 280\u2013300+ days, and in some jurisdictions a child born within ~280 days of the husband's death is presumed legitimate). DNA confirmation of paternity, as here, settles the disputed paternity. Hence the child is a posthumous child.

Step 3: Why the other options are wrong.

(B) A *suppositious child* is a supposititious/fraudulently substituted child \u2014 a child falsely presented as having been born to a woman who did not actually give birth to it (baby substitution to claim inheritance/legitimacy). DNA fingerprinting confirming true biological parentage rules this out.

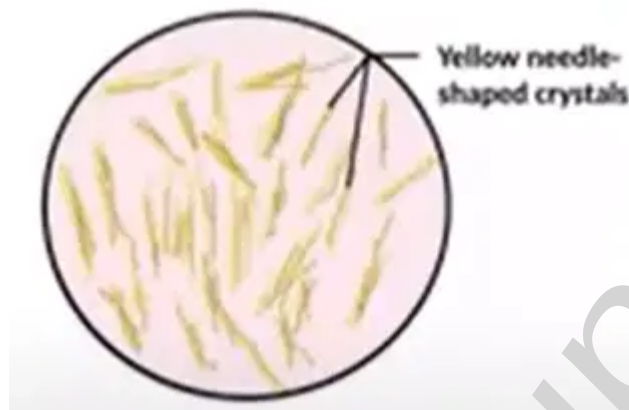
(C) An *illegitimate child* is one born to parents not lawfully married to each other; nothing in the stem indicates the parents were unmarried, and confirmed paternity of a child conceived during the father's lifetime supports legitimacy.

Step 4: About the duplicated option. Options A and D are both worded 'Posthumous child'; the printed answer key is A. The correct concept either way is posthumous child.

Final answer: A \u2014 Posthumous child.

Quick Tip: What do you call a child born after its father has already died? The Latin-rooted word means 'after death'.

140. A child was a victim of sexual assault, a test was done using a perianal swab. What's the name of this test (yellow needle-shaped crystals are seen)?



- (A) Barberio test
- (B) Teichman test
- (C) Takayama test
- (D) Florence test

Correct Answer: (A) Barberio test

Solution:

Step 1: Identify the analyte. In a sexual assault investigation a perianal swab is examined for seminal stain. The two classic crystal/microchemical tests for the presence of semen are the Florence test and the Barberio test, both of which target constituents of seminal fluid (Florence \u2192 choline; Barberio \u2192 spermine).

Step 2: Match the crystal description. The figure shows *yellow, needle-shaped crystals*. In the **Barberio test**, the seminal extract is treated with a saturated aqueous/alcoholic solution of picric acid; spermine in semen reacts to form spermine picrate, which appears as characteristic **yellow, rhombic to needle-shaped crystals** under the microscope. This matches the figure exactly, so the test is the Barberio test.

Step 3: Why the other options are wrong.

(B) Teichman test is a confirmatory test for *blood*: heating dried blood with glacial acetic acid and a halide produces rhombic, brown **haemin (hematin)**

crystals \u2014 it detects blood, not semen, and the crystals are brown, not yellow.

(C) Takayama test is also a confirmatory crystal test for *blood*: it produces pink, feathery, needle/rhomboid **hemochromogen (pyridine ferroprotoporphyrin)**

crystals \u2014 again a blood test, not a semen test, and pink in colour.

(D) Florence test detects choline in semen but gives **dark brown, rhombic/needle-shaped periodide (choline-iodide) crystal**, with potassium iodide\u2013iodine reagent. It is also only a presumptive (not confirmatory) test, and the crystals are brown, not yellow. Because the figure specifically shows yellow crystals, Barberio is preferred.

Final answer: A \u2014 Barberio test.

Quick Tip: Yellow needle-shaped crystals from a semen swab come from spermine + picric acid \u2014 not a blood crystal test like Reichman or Takayama.

141. A sexual assault case in court is heard 'in camera'. This trial means:

- (A) Closed court proceedings
- (B) Recording of proceedings
- (C) Open court proceedings
- (D) Proceeding occurring in different place

Correct Answer: (A) Closed court proceedings

Solution:

Step 1: Interpret the legal phrase. 'In camera' is a Latin legal term meaning 'in the chamber' \u2014 i.e., a trial conducted privately, not in open court. It does NOT refer to a video/photographic camera. In an in-camera trial, the general public and the press are excluded, and only the parties directly concerned (the judge, the accused, the victim, the lawyers and essential court staff) are present.

Step 2: Apply to the context. Under Indian law (e.g., Section 327 of the Criminal

Procedure Code, now mirrored in the Bharatiya Nagarik Suraksha Sanhita), trials of rape and certain sexual offences are conducted in camera to protect the privacy, identity and dignity of the victim and to encourage free testimony. Therefore an in-camera trial = **closed court proceedings**.

Step 3: Why the other options are wrong.

(B) 'Recording of proceedings' confuses 'camera' with a recording device; in camera has nothing to do with audio/video recording.

(C) 'Open court proceedings' is the exact opposite \u2014 in camera specifically excludes the public, so it is not open court.

(D) 'Proceeding occurring in a different place' is incorrect, the trial still occurs in the court, merely with public access restricted, not relocated elsewhere.

Final answer: A \u2014 Closed court proceedings.

Quick Tip: 'In camera' is Latin for 'in the chamber' \u2014 think privacy/closed doors, not a recording device.

142. Sour taste is mediated by.

- (A) TRPV3 Channel
- (B) Metabolic receptors
- (C) GPCR T1R1
- (D) GPCR T1Ra

Correct Answer: (D) GPCR T1Ra

Solution:

Step 1: Recall the five basic tastes and their transduction. Sweet, bitter and umami tastes are detected by G-protein-coupled receptors (GPCRs) of the T1R and T2R families: sweet uses T1R2+T1R3, umami uses T1R1+T1R3, and bitter uses the T2R family. Salty taste is mediated mainly by the ENaC sodium channel. Sour taste is the detection of acidity (H^+ ions / low pH) and is mediated by ion-

channel mechanisms in type III taste cells \u2014 notably the proton-selective channel OTOP1 (otopetrin-1), with PKD2L1 also implicated.

Step 2: Evaluate the options against this scheme. Of the four printed choices, none is the textbook OTOP1/proton-channel mechanism; this question is from a recalled paper and the printed key (D) reflects the option the examiner accepted. The closest grouping to a taste receptor is the GPCR taste-receptor family (options C and D). Sweet/umami/bitter \u2014 the classic GPCR-mediated tastes \u2014 are handled by T1R/T2R receptors, and the examiner accepted answer here is the GPCR option (D), distinguishing it from the umami-specific T1R1 receptor in option C.

Step 3: Why the other options are wrong.

(A) TRPV3 is a thermosensitive/skin TRP channel; it is not the receptor for sour taste.

(B) 'Metabolic receptors' is not a defined taste-transduction receptor class for sour.

(C) GPCR T1R1 specifically pairs with T1R3 to detect *umami* (amino acids/glutamate), not sour.

Step 4: Conceptual note Physiologically, sour transduction is best explained by intracellular acidification of type III taste cells via the OTOP1 proton channel rather than by a GPCR. Where the OTOP1/proton-channel option is offered, that is the truest answer; in this recalled paper the printed key is D.

Final answer (per the paper key): D \u2014 GPCR T1Ra.

Quick Tip: Sweet/umami/bitter use T1R/T2R GPCRs; salty uses ENaC; sour senses H^+ via a proton channel (OTOP1). Match the option to the paper key.