Answers

1. **Answer: b**

Explanation:

Wound Healing by Primary Intention

Tidy wounds, typically caused by sharp instruments and lacking dead tissue (devitalised tissues), are expected to heal via **primary healing**, also known as healing by first intention.

Primary Healing Explained

This method is characterized by:

- Minimal tissue loss.
- Clean, closely approximated edges (often sutured or glued).
- Direct closure by the body's natural healing processes.
- Minimal scar formation.

The process involves the rapid formation of granulation tissue and re-epithelialization across the wound gap.

Why Other Options Are Less Suitable

- **Secondary healing**: Typically occurs in wounds with significant tissue loss (e.g., burns, ulcers) where the edges cannot be brought together. Healing happens by granulation, contraction, and epithelialization from the base upwards.
- **Formation of contracture**: While wound contraction is part of healing (especially secondary healing), it is not the primary mechanism for a clean, tidy wound.
- **Skin grafting**: A surgical procedure used for large areas of skin loss, not the standard healing method for simple, tidy wounds.

Therefore, the ideal healing method for the described wound is primary healing.

2. **Answer: b**

Explanation:

Small Bowel Tuberculosis: Identifying the Incorrect Statement

This question asks to identify the statement that is **incorrect** regarding small bowel tuberculosis (TB). We need to evaluate each option based on the known characteristics of the disease.

- **Option A: Correct.** Small bowel TB is generally classified into two main pathological types: the ulcerative type and the hyperplastic type.
- **Option B: Incorrect.** This statement claims strictures are common in the *ulcerative* type. However, strictures, characterized by narrowing of the bowel lumen due to fibrosis and inflammation, are typically more characteristic of the *hyperplastic* form of small bowel TB, not the ulcerative form. The ulcerative type is more prone to complications like perforation or fistulas.
- **Option C: Correct.** In cases of ulcerative small bowel TB, especially when associated with peritoneal TB, the serosal surface of the bowel can indeed be observed to be studded with tubercles (small nodules).
- **Option D: Correct.** The ulcerative pattern of intestinal TB often arises when the infectious agent (*Mycobacterium tuberculosis*) is highly virulent, overwhelming the host's immune defenses, leading to tissue necrosis and ulceration.

Conclusion on Small Bowel TB Types

Based on the analysis, the statement claiming strictures are common in the ulcerative type is the exception. Strictures are more typically associated with the hyperplastic form of small bowel TB.

3. **Answer: a**

Explanation:

The question asks to identify the characteristic that is NOT part of Systemic Inflammatory Response Syndrome (SIRS). SIRS is defined by a set of clinical signs indicating a widespread inflammatory state. Let's analyze the options based on the established SIRS criteria.

SIRS Criteria Analysis

The typical criteria for SIRS include at least two of the following:

- **Temperature:** Core body temperature < 36°C or > 38°C.
- **Heart Rate (Tachycardia):** Heart rate > 90 beats per minute.
- **Respiratory Rate (Tachypnoea):** Respiratory rate > 20 breaths per minute or partial pressure of carbon dioxide ($<\mathrm{PaCO_2}$) < 32 mmHg.
- **White Blood Cell (WBC) Count:** WBC count < 4,000 cells/mm³ or > 12,000 cells/mm³, or immature neutrophils (bands) > 10%.

Evaluating the Options

- **Option 1: Release of lipopolysaccharide endotoxins...** This describes a potential trigger or cause of SIRS, particularly in infections caused by Gram-negative bacteria. It is not a clinical manifestation or criterion of SIRS itself.
- **Option 2: Tachycardia with a heart rate of more than** $90/\mathrm{min}$ This aligns directly with one of the standard SIRS criteria.
- **Option 3: White cell count** $< 5000/\mathrm{mm}^3$ This represents leukopenia, which is included in the WBC count criteria for SIRS (along with leukocytosis).
- **Option 4: Tachypnoea with a respiratory rate of** $> 20/\mathrm{min}$ This aligns directly with one of the standard SIRS criteria.

Conclusion on SIRS Exception

Options 2, 3, and 4 represent physiological signs that are part of the diagnostic criteria for SIRS. Option 1 describes a causative factor, not a clinical characteristic of the syndrome itself. Therefore, the release of lipopolysaccharide endotoxins is the exception.

4. **Answer: c**

Explanation:

Parathyroid Adenoma Common Site: Inferior Lobe

Parathyroid adenomas are benign tumors arising from the parathyroid glands.

The four parathyroid glands are typically located posterior to the thyroid gland, with two superior and two inferior glands.

While adenomas can occur in any of the parathyroid glands, variations in developmental migration make the inferior glands a more frequent site.

Most Common Location: The **inferior parathyroid lobe** is the most common site for a parathyroid adenoma.

This higher frequency is often attributed to the longer and more variable descent path of the inferior parathyroid glands during embryonic development compared to the superior glands.

5. **Answer: a**

Explanation:

Sonographic Finding of Clear Fluid Cysts

In diagnostic ultrasound, the way tissues appear depends on how they reflect sound waves (echogenicity).

A cyst containing simple, clear fluid typically does not reflect sound waves significantly. This lack of echo reflection results in a very dark or black appearance on the ultrasound image.

The term used to describe this lack of echoes is:

- **Anechoic**: This means without echoes. Structures that are anechoic appear black on ultrasound. Clear fluid, such as in a simple cyst, is the classic example.

Other echogenicity terms describe different appearances:

- **Hypoechoic**: Means having fewer echoes than surrounding tissue; appears dark gray.
- **Isoechoic**: Means having the same echogenicity as surrounding tissue; appears similar in brightness.
- **Hyperechoic**: Means having more echoes than surrounding tissue; appears bright or white.

Therefore, a cyst containing clear fluid is described sonographically as anechoic.

---

6. **Answer: d**

Explanation:

Histological Grade and Prognosis Correlation

The histological grade of a malignancy assesses how abnormal the cancer cells appear under a microscope and influences the predicted course of the disease (prognosis).

Analyzing Malignancy Prognosis Factors

Different cancers rely on various factors for prognostic assessment. Let's review the options:

- **Prostate cancer:** Prognosis is influenced by the Gleason score (a grading system) but significantly relies on clinical stage and PSA levels.
- **Melanoma:** Prognosis is primarily determined by tumor thickness (Breslow depth), ulceration, and mitotic rate rather than a distinct histological grade.

- **Colonic adenocarcinoma:** While tumor grade (differentiation) is considered, the overall TNM stage is the most critical prognostic factor.
- **Soft tissue sarcoma:** Histological grade is a primary determinant of prognosis. High-grade sarcomas (e.g., Grade 3) tend to grow faster, metastasize more frequently, and have a poorer prognosis compared to low-grade sarcomas (e.g., Grade 1).

Conclusion on Grading and Prognosis

Among the choices provided, the histological grade shows the strongest correlation with the prognosis specifically in **soft tissue sarcomas**.

---

7. **Answer: c**

Explanation:

Perforator Matching Solution

This question requires matching specific perforating veins (List I) with their anatomical locations (List II). Correctly identifying these anatomical landmarks is crucial for understanding venous circulation and related pathologies.

Matching Perforator Veins to Sites

Based on established anatomical references and the provided correct answer code, the correct pairings are:

- **Boyd's (A)** perforators are located **Below the knee (3)**.
- **Dodd's (B)** perforators are found in the **Mid thigh (2)**.
- **Cockett's (C)** perforators are situated **Above the ankle (4)**.
- **Bassi's (D)** perforators are located approximately **5 cm above the calcaneus (1)**.

Correct Code Verification

The code representing the correct matchings (A-3, B-2, C-4, D-1) corresponds to option C.

The table below summarizes the correct pairings:

List I Item	List II Item	Description
A. Boyd's	3	Below the knee
B. Dodd's	2	Mid thigh
C. Cockett's	4	Above the ankle
D. Bassi's	1	5 cm above the calcaneus

Therefore, the correct code is 3, 2, 4, 1 for A, B, C, and D respectively.

---

8. **Answer: d**

Explanation:

Understanding ABPI in Critical Limb Ischemia

The Ankle-Brachial Pressure Index (**ABPI**) is a key diagnostic tool used to assess peripheral artery disease (PAD). It compares the blood pressure in the ankles to the blood pressure in the arms.

ABPI Interpretation

- A normal **ABPI** is typically between 1.0 and 1.4.
- Values between 0.7 and 0.9 suggest mild PAD.
- Values between 0.4 and 0.7 indicate moderate PAD.
- **Critical limb ischemia** is generally defined by an **ABPI** value less than 0.4. However, significantly low values, such as less than 0.3, are highly indicative of this severe condition, signifying severely compromised blood flow to the limb.

Therefore, when a patient suffers from **critical limb ischemia**, the **ABPI** is less than 0.3.

9. **Answer: b**

Explanation:

Diagnosis of Primary Hyperparathyroidism

The most significant indicator for diagnosing primary hyperparathyroidism is elevated serum calcium levels.

Key Diagnostic Indicator: Serum Calcium

Primary hyperparathyroidism is characterized by the overactivity of one or more parathyroid glands, leading to excessive secretion of parathyroid hormone (PTH). This excess PTH causes:

- Increased release of calcium from bones.
- Increased reabsorption of calcium by the kidneys.
- Increased production of active vitamin D, enhancing intestinal calcium absorption.

Consequently, hypercalcemia (high serum calcium) is the most common and crucial biochemical finding. A serum calcium level above the normal range, typically considered around $8.5 \text{ to } 10.5 \text{ mg/dL}$, strongly suggests the condition. Specifically, levels above 11 mg/dL are highly indicative.

Evaluating Other Options

While other tests might be abnormal in primary hyperparathyroidism, they are less specific or consistently elevated than serum calcium:

- **Serum acid phosphatase:** This enzyme is not typically used for diagnosing primary hyperparathyroidism. Levels are more commonly associated with prostate issues or Paget's disease of bone.
- **Urinary calcium:** While urinary calcium levels can vary, a level below 100 mg/day does not specifically point to primary hyperparathyroidism. In fact, many

patients with this condition have normal or even high urinary calcium excretion. Low urinary calcium might suggest other conditions like familial hypocalciuric hypercalcemia (FHH).

- **Serum alkaline phosphatase:** This enzyme can be elevated, especially if there is significant bone disease (like osteitis fibrosa cystica) resulting from prolonged hyperparathyroidism. However, it's often normal in mild or early cases and is less consistently elevated than serum calcium.

Therefore, a significantly elevated serum calcium level, such as $> 11\ \mathrm{mg/dL}$, is the strongest diagnostic suggestion for primary hyperparathyroidism among the choices provided.

---

10. **Answer: c**

Explanation:

Breast Cancer Staging: Key Factors

Determining the stage of breast cancer involves assessing the tumour size (T), lymph node involvement (N), and presence of distant metastasis (M), using the TNM system. The stage groups are based on specific combinations of T, N, and M classifications.

TNM Classification Breakdown

- **Tumour Size (T):** The patient has a 6 cm breast tumour. According to TNM criteria, a tumour greater than 5 cm is classified as **T3**.
- **Lymph Nodes (N):** The presence of mobile, clinically positive, ipsilateral axillary lymph nodes indicates regional lymph node involvement. This typically corresponds to the **N1** classification.
- **Metastasis (M):** The absence of evidence for distant metastasis means the classification is **M0**.

Determining the Stage Group

Combining the classifications gives us **T3 N1 M0**.

Based on the American Joint Committee on Cancer (AJCC) staging manual (typically the 8th edition for current practice):

- T3 indicates a tumour > 5 cm.
- N1 indicates metastasis in 1 to 9 axillary lymph nodes and/or possible internal mammary nodes without distant metastasis.
- M0 indicates no distant metastasis.

The combination **T3 N1 M0** corresponds to **Stage III A** breast cancer.

Stage Conclusion

Therefore, based on the clinical presentation of a 6 cm tumour with mobile ipsilateral axillary lymph nodes and no distant metastasis, the breast cancer is classified as Stage IIIA.

---

11. **Answer: d**

Explanation:

Clinical Presentation: Haematemesis & Splenomegaly Analysis

This question asks to identify which condition among the options is typically NOT associated with the simultaneous presentation of **haematemesis** (vomiting blood) and **massive splenomegaly** (enlarged spleen) in a young patient.

Condition Associations

- **Malaria:** Severe malaria can lead to significant splenomegaly. While less common, complications like splenic rupture or severe anaemia can potentially cause haematemesis.

- **Kala-azar (Visceral Leishmaniasis):** This parasitic disease is strongly associated with marked hepatosplenomegaly. It can also cause portal hypertension, leading to oesophageal varices and subsequent haematemesis.
- **Portal Hypertension:** This condition, often resulting from liver disease or splenic issues, directly causes increased pressure in the portal vein system. This leads to splenomegaly and the formation of fragile oesophageal varices, a primary cause of massive haematemesis.
- **Idiopathic Thrombocytopenic Purpura (ITP):** ITP is an autoimmune disorder causing low platelet counts. While mild to moderate splenomegaly can occur as the spleen removes platelets, it is not typically massive. The primary bleeding manifestation is usually purpura, petechiae, or mucosal bleeding related to low platelets, not typically massive haematemesis from varices. Therefore, ITP is the least likely condition to present with *both* massive splenomegaly and significant haematemesis compared to the other options.

Conclusion

Based on the typical clinical manifestations, Malaria, Kala-azar, and Portal hypertension are all strongly associated with conditions leading to massive splenomegaly and haematemesis. Idiopathic thrombocytopenic purpura is primarily characterized by low platelets and bleeding related to thrombocytopenia, with massive splenomegaly and haematemesis being atypical presentations.

---

12. **Answer: c**

Explanation:

Idiopathic Thrombocytopenic Purpura Features Explained

Idiopathic Thrombocytopenic Purpura (ITP) is an autoimmune disorder characterized by low platelet levels. Understanding its common clinical features is crucial for diagnosis.

Common Signs of ITP

- **Thrombocytopenia:** This is the hallmark of ITP, defined as a significantly low platelet count (typically < 100,000/µL) without an apparent cause.
- **Bleeding Symptoms:** Due to low platelets, patients often experience bleeding. Common manifestations include:
  - **Cutaneous ecchymoses:** Bruises appearing on the skin, often spontaneously or with minor trauma.
  - **Epistaxis:** Nosebleeds that can range from mild to severe.

Atypical Feature in ITP

While mild enlargement of the spleen (splenomegaly) can occasionally be noted in ITP due to increased platelet destruction, **massive splenomegaly** is generally considered atypical. Its presence often suggests other underlying conditions, such as myeloproliferative disorders or chronic infections, rather than being a common feature of ITP itself.

Therefore, massive splenomegaly is the feature that is NOT commonly associated with Idiopathic Thrombocytopenic Purpura among the choices provided.

Correct Answer Analysis: The question asks for the feature *excepted* from common ITP signs. Epistaxis, cutaneous ecchymoses, and thrombocytopenia are classic findings. Massive splenomegaly is uncommon in ITP.

---

13. **Answer: b**

Explanation:

Investigation of Choice for Common Bile Duct (CBD)

The question asks to identify the primary diagnostic tool for examining the common bile duct (CBD).

Evaluating the options:

- **Ultrasonography:** Often used as an initial test, it can detect gallstones and significant CBD dilation but has limitations in visualizing the entire duct structure and subtle abnormalities.
- **CECT Abdomen:** Useful for assessing surrounding structures and complications like pancreatitis or tumors, but less sensitive than MRCP for detecting intrinsic CBD pathology like stones or strictures.
- **HIDA scan:** This assesses biliary system function and drainage, not primarily the detailed anatomy of the CBD.
- **MRCP (Magnetic Resonance Cholangiopancreatography):** This non-invasive imaging technique provides detailed, high-resolution images of the entire biliary tree, including the CBD and intrahepatic ducts. It is highly effective at identifying filling defects (like stones), narrowing (strictures), leaks, and other structural abnormalities within the CBD.

Therefore, MRCP is considered the investigation of choice for evaluating the common bile duct due to its superior visualization capabilities.

---

14. **Answer: a**

Explanation:

Spleen's Role: Pitting Malarial Parasites from RBCs

The spleen plays a critical role in filtering the blood and removing abnormal components of red blood cells (RBCs).

Understanding Spleen Functions

- **Pitting:** This is the process where the spleen removes small inclusions or parasites from *within* intact red blood cells. The RBC itself is generally preserved.
- **Culling:** This involves the removal and destruction of entire red blood cells that are damaged, aged, or otherwise abnormal.
- **Phagocytosis:** This is the general process of engulfing and destroying foreign particles or cells. While the spleen performs phagocytosis, pitting is a more

specific term for removing inclusions from RBCs.

Mechanism for Malarial Parasites

Malarial parasites infect red blood cells. The spleen identifies infected RBCs and removes the parasites (merozoites or stages) directly from the RBC cytoplasm through the process of **pitting**. This action helps clear the infection without necessarily destroying every infected RBC immediately, allowing for the removal of the parasite burden.

Culling would occur if the infected RBC becomes too damaged or rigid to pass through the spleen's sinusoids, leading to the removal of the entire cell.

Therefore, the specific removal of malarial parasites *from* the red blood cells is termed pitting.

---

15. **Answer: c**

Explanation:

Prognostic Indicators in Portal Hypertension Explained

Prognostic indicators help predict the likely course and outcome of a disease. In portal hypertension, certain clinical and laboratory findings are crucial for assessing patient prognosis. Let's evaluate the given options:

- **Serum Albumin:** Low levels of serum albumin suggest reduced liver synthetic function. This impairment is a significant negative prognostic indicator in liver diseases, including portal hypertension.
- **Serum Bilirubin:** Elevated serum bilirubin levels indicate compromised liver function, specifically the liver's inability to process and excrete bilirubin. Higher levels correlate with disease severity and poorer outcomes.
- **Ascites:** The development of ascites (fluid accumulation in the abdomen) is a sign of decompensated liver disease and portal hypertension. Its presence, and

particularly its severity or resistance to treatment, is a major factor impacting prognosis.

- **Serum Globulin:** While changes in globulin levels can occur in liver disease, serum albumin is considered a more direct and reliable indicator of synthetic function and prognosis compared to globulin levels alone.

Identifying Key Prognostic Indicators

Based on the clinical significance:

- Serum albumin (2) is a key indicator of liver function and prognosis.
- Serum bilirubin (3) reflects liver dysfunction and severity, impacting prognosis.
- Ascites (4) signifies disease decompensation and is a critical prognostic factor.
- Serum globulin (1) is less consistently used as a primary prognostic marker compared to the others.

Therefore, the prognostic indicators among the choices provided are Serum albumin, Serum bilirubin, and Ascites.

Correct Answer Derivation

The correct combination includes items 2, 3, and 4. This corresponds to the option listing Serum albumin, Serum bilirubin, and Ascites.

---

16. **Answer: b**

Explanation:

Understanding Saint's Triad

Saint's triad refers to the common coexistence of specific medical conditions. Identifying these components is key in clinical diagnosis.

Components of the Triad

The traditionally accepted components of Saint's triad are:

- Gallstones
- Hiatus Hernia
- Meckel's Diverticulum

Variations exist, but the core involves specific pathological conditions.

Analyzing the Options

We evaluate each option to see if it fits the definition of Saint's triad:

- **Gall stones:** This is a well-established component of the triad.
- **Jaundice:** Jaundice is a clinical **sign** indicating potential liver or biliary issues. While gallstones can cause jaundice by obstructing the bile duct, jaundice itself is a symptom, not a structural component forming the triad.
- **Hiatus hernia:** This is another definitive component of the triad.
- **Colonic diverticulosis:** This refers to the presence of pouches in the colon wall. While it's a condition, it is not the classic third component (Meckel's Diverticulum) and differs fundamentally from jaundice, which is a symptom.

Identifying the Exception

The question asks for the item that does *not* constitute the Saint's triad. Gallstones and hiatus hernia are definite components. Colonic diverticulosis is a condition, though not the classic third element. Jaundice, however, is a symptom or sign, not a condition that defines the triad itself. Therefore, jaundice is the exception.

---

17. **Answer: b**

Explanation:

Epigastric Mass Diagnosis in Alcoholic Patient

A 40-year-old male with a history of alcoholism presents with 10 days of acute epigastric pain and vomiting, along with a palpable epigastric mass.

Clinical Picture Analysis

- **History:** Alcoholism is a major risk factor for acute and chronic pancreatitis.
- **Symptoms:** Epigastric pain and vomiting suggest pancreatic or upper gastrointestinal pathology.
- **Clinical Finding:** An epigastric mass points towards a localized collection or tumor.

Differential Diagnosis Evaluation

The combination of alcoholism, chronic symptoms, and an epigastric mass strongly suggests a complication related to pancreatitis.

- **Perforated peptic ulcer with abscess:** Less likely to present primarily as a chronic mass over 10 days; typically more acute.
- **Pseudopancreatic cyst:** A common complication of chronic pancreatitis (often alcohol-induced), presenting as a fluid collection that can form a palpable mass. The symptoms align well with this diagnosis.
- **Carcinoma of the head of the pancreas:** While possible, a pseudocyst is a more frequent consequence of chronic pancreatitis, especially in an alcoholic patient presenting with these specific symptoms and a mass.
- **Hepatoma in left lobe of liver:** Unlikely given the epigastric location of pain and the mass, primarily pointing towards pancreatic origin.

Conclusion

Given the patient's history of alcoholism, classic symptoms of pancreatitis (pain, vomiting), and the presence of an epigastric mass, a pseudopancreatic cyst is the most probable diagnosis.

---

18. Answer: d

Explanation:

Surgery Indications in Acute Pancreatitis

Intervention in acute pancreatitis is typically reserved for specific, severe complications. While fluid collections and pseudocysts can occur, they are often managed conservatively unless they become symptomatic or infected. Sterile pancreatic necrosis also usually receives initial conservative treatment.

Key Indication for Intervention

Surgery or other invasive procedures are most strongly indicated when pancreatic necrosis becomes **infected**. This complication significantly increases the risk of sepsis, organ failure, and mortality. Prompt drainage or debridement is crucial.

Analysis of Options:

- **Acute fluid collection:** May resolve spontaneously or require drainage if symptomatic. Not the primary indication for immediate surgery.
- **Acute pseudocyst:** Usually monitored; intervention is needed only if large, symptomatic, or complicated (e.g., rupture, infection).
- **Sterile pancreatic necrosis:** Management is often conservative initially. Intervention is considered if necrosis fails to resolve, becomes symptomatic, or shows signs of infection.
- **Infected pancreatic necrosis:** This is a life-threatening condition requiring urgent intervention, often involving minimally invasive drainage or surgical debridement to control sepsis.

Therefore, **infected pancreatic necrosis** is the condition among the choices that most definitively indicates the need for surgical or minimally invasive intervention in acute pancreatitis.

---

19. Answer: c

Explanation:

Most Common Site for Breast Cancer Skeletal Metastases

The most frequent site for skeletal metastases in carcinoma of the breast is the **lumbar vertebrae**.

Understanding Skeletal Metastasis Location

Skeletal metastases occur when cancer spreads from the primary site (in this case, the breast) to the bones.

- The vertebral column (spine) is the most common skeletal site overall for metastases from breast cancer.
- This includes both the thoracic and lumbar regions.
- Among these, the **lumbar vertebrae** are specifically the most common single site.

Why Vertebrae Are Common Metastasis Sites

Vertebrae, particularly the lumbar and thoracic regions, are common sites due to:

- Rich blood supply (vascularity).
- Presence of red bone marrow, which is favorable for cancer cell implantation and growth.

The specific hemodynamic patterns and anatomical structure may favor the lumbar region.

---

20. Answer: c

Explanation:

Median Nerve Injury: Index Finger Flexion Sign

The inability to flex the index finger is a specific clinical sign often associated with damage to the **median nerve**.

Role of the Median Nerve

The median nerve controls several muscles in the forearm and hand. Specifically, it innervates the flexor digitorum superficialis (FDS) muscle, which is a primary flexor of the finger at the proximal interphalangeal (PIP) joint. It also contributes to the flexion of the index finger at the metacarpophalangeal (MCP) joint via the first lumbrical muscle.

- Injury to the median nerve can impair the function of the FDS muscle.
- This impairment leads to difficulty or inability in flexing the index finger, particularly noticeable at the PIP joint.

Evaluating Other Options

The other options are less likely to cause this specific symptom:

- **Ulnar nerve injury:** Primarily affects the little and ring fingers, and hand intrinsic muscles responsible for abduction, adduction, and thumb opposition.
- **Radial nerve injury:** Affects wrist and finger extension (causing wrist drop) and sensation on the back of the hand. It does not directly impact finger flexion.
- **Dupuytren's contracture:** A condition causing thickening of the palmar fascia, leading to finger flexion contractures (usually ring and little fingers), but not an *inability* to actively flex due to nerve damage.

Conclusion

Therefore, the inability to flex the index finger strongly suggests a lesion affecting the **median nerve**.

---

21. Answer: d

Explanation:

Diagnostic Peritoneal Lavage (DPL) Positive Criteria

Diagnostic Peritoneal Lavage (DPL) is a procedure used to detect internal bleeding or injuries in the abdomen following trauma. Interpreting the characteristics of the fluid retrieved is crucial for diagnosis.

Evaluating DPL Findings in Trauma

Several findings from the DPL fluid indicate a positive result, suggesting significant intra-abdominal injury:

- **Gross Blood:** The presence of $10\ \mathrm{ml}$ or more of gross blood upon initial aspiration is a definitive sign of substantial hemorrhage.
- **W.B.C. Count:** A White Blood Cell (W.B.C.) count exceeding $500/\mathrm{cu\ mm}$ in the lavage fluid suggests inflammation or peritonitis, often resulting from organ damage or perforation.
- **Amylase Level:** An elevated amylase level, measured at more than $175\ \mathrm{IU/dL}$, can indicate pancreatic injury or other gastrointestinal tract damage.
- **R.B.C. Count:** A Red Blood Cell (R.B.C.) count greater than $100,000/\mathrm{cu\ mm}$ is considered another indicator of significant internal bleeding into the peritoneal cavity.

In the context of abdominal trauma assessment using DPL, all four listed findings (gross blood, elevated W.B.C. count, elevated amylase level, and elevated R.B.C. count) represent criteria for a positive DPL result, necessitating further medical intervention.

---

22. **Answer: d**

Explanation:

Breast Reconstruction Procedures Excepted

After radical surgery for breast carcinoma, reconstructive procedures aim to restore the breast mound. Several standard techniques are available, but one option is typically excluded for this purpose.

Common Breast Reconstruction Techniques

The following are widely used for breast reconstruction:

- **Silicon implants**: Prosthetic devices used to recreate breast volume.
- **Latissimus dorsi flap (LD flap)**: A procedure using muscle and skin from the patient's back.
- **Transversus abdominis muscle flap (TRAM flap)**: Involves transferring abdominal tissue (muscle and skin) to reconstruct the breast.

Deltopectoral Flap: The Exception

The **Deltopectoral flap** is a pedicled flap raised from the chest area. While historically used for certain chest wall reconstructions or smaller defects, it is not a preferred or standard method for creating a full breast mound after mastectomy for carcinoma. Its limitations in providing adequate volume and contour make it less suitable compared to implants or other major tissue flaps.

Therefore, the Deltopectoral flap is the procedure excepted among the given choices for comprehensive breast reconstruction post-surgery.

---

23. Answer: c

Explanation:

Wolfe Graft Definition

A **Wolfe graft** is specifically defined as a **small full thickness skin graft**.

This type of graft involves harvesting the entire layers of the skin – the epidermis and the full dermis – from the donor site. It is often referred to as "small" because

harvesting full-thickness grafts is typically limited to smaller areas to avoid significant donor site defects.

Comparison with Other Graft Types

Understanding the distinction is key:

- **Partial thickness skin graft**: Includes epidermis and only a portion of the dermis.
- **Pinch skin graft**: A variation of a partial thickness graft, typically small and slightly raised.
- **Pedicle graft**: Remains attached to the donor site, maintaining its blood supply while being moved to the recipient site.

The Wolfe graft, being a **small full thickness skin graft**, differs significantly from these other methods in the depth of tissue harvested and its subsequent healing process.

---

24. **Answer: a**

Explanation:

Diaphyseal Aclasis Hallmarks Explained

Diaphyseal aclasis, also known as Multiple Hereditary Exostoses (HME), is a genetic disorder affecting bone development. The question requires identifying the feature listed that is *not* a typical characteristic (hallmark) of this condition.

Analyzing Diaphyseal Aclasis Characteristics

We will evaluate each provided option:

- **Option 4: It is inherited as an autosomal dominant dysplasia**
  This statement accurately describes the inheritance pattern of Diaphyseal aclasis. It is a well-established hallmark.
- **Option 2: Genu valgum can be found**
  Bone deformities, including genu valgum (commonly known as knock knees),

frequently occur in patients with Diaphyseal aclasis due to the underlying skeletal abnormalities. This is a known hallmark.

- **Option 3: Chondrosarcoma may occur in less than 1% cases**
  Malignant transformation into chondrosarcoma is a rare but recognized potential complication of Diaphyseal aclasis. The low percentage confirms its status as a possible, though infrequent, characteristic.
- **Option 1: Pseudoarthrosis is common**
  Pseudoarthrosis, the development of a false joint, is not considered a common or primary hallmark feature of Diaphyseal aclasis. While it might occur in some cases, it is not as characteristic as the other features mentioned and is more strongly associated with other genetic conditions.

Identifying the Exception

Comparing the options, the most accurate exception to the common hallmarks of Diaphyseal aclasis is the claim that pseudoarthrosis is common.

Therefore, "Pseudoarthrosis is common" is the feature that does not typically characterize Diaphyseal aclasis.

---

25. **Answer: a**

Explanation:

Colles' Fracture Complications Explained

A Colles' fracture involves a break in the distal radius, typically with dorsal displacement of the distal fragment.

While several complications can arise from a Colles' fracture, certain ones are more frequent than others.

Common Complications of Colles' Fracture

- **Malunion:** This occurs when the fractured bone heals in an anatomically incorrect position. For Colles' fractures, this often means the distal radius heals with residual dorsal angulation and shortening, potentially leading to wrist deformity and dysfunction. It is widely considered the **most common** complication.
- **Delayed union:** The fracture takes longer than usual to heal.
- **Non-union:** The fracture fails to heal completely.
- **Sudeck's osteodystrophy (Complex Regional Pain Syndrome - CRPS):** A painful, disabling condition affecting an arm or leg, often occurring after an injury or surgery. While serious, it's not typically the most frequent complication compared to malunion.

Given the nature of the injury, achieving perfect anatomical reduction can be challenging, making malunion a frequent outcome if not managed correctly. Therefore, malunion is identified as the most common complication.

---

26. **Answer: d**

Explanation:

Pulmonary Tuberculosis Surgery Indications: Identifying the Exception

The question asks to identify which condition among the given options is NOT an indication for surgery in patients suffering from pulmonary tuberculosis (TB).

Analyzing Surgical Indications in Pulmonary TB

Surgery is considered in specific, often severe, circumstances related to pulmonary TB. Let's analyze the options:

- **Severe life-threatening haemoptysis:** Significant bleeding from pulmonary TB cavities is a medical emergency. Surgical resection (like lobectomy or

pneumonectomy) may be required to control the bleeding when conservative measures fail.

- **Drug-resistant chronic tuberculous abscess:** When a tuberculous abscess does not respond to anti-TB medications, especially if it's drug-resistant and poses an ongoing risk, surgery might be necessary for drainage or removal.
- **Aspergilloma within a tuberculous cavity with recurrent haemoptysis:** The presence of a fungal ball (aspergilloma) in a TB cavity, particularly when causing repeated bleeding episodes, is a strong indication for surgical excision of the affected lung area.
- **AFB positive sputum with normal chest CT scan:** Acid-Fast Bacilli (AFB) positive sputum indicates active TB infection. However, a normal chest CT scan suggests the absence of significant structural lung damage, complications like large cavities, abscesses, or extensive disease that would typically warrant surgical intervention. Standard medical treatment is usually sufficient in such cases.

Conclusion: The Exception

A normal chest CT scan, despite the presence of AFB in sputum, indicates that the disease is likely manageable medically and has not progressed to a stage requiring surgical intervention. Therefore, this scenario is the exception among the listed options.

---

27. **Answer: c**

Explanation:

Right Main Bronchus Lodging of Foreign Bodies

Inhaled foreign bodies preferentially enter the **right main bronchus** due to specific anatomical features compared to the left main bronchus.

Anatomical Differences and Aspiration

- **Right Main Bronchus:** It is anatomically distinct, being **shorter**, **wider**, and more **vertical** (straighter) in its orientation relative to the trachea.
- **Left Main Bronchus:** Conversely, the left main bronchus is **longer**, **narrower**, and arises from the trachea at a more **acute angle** (more horizontal).

This configuration of the right main bronchus makes it a more direct and easier pathway for aspirated objects to travel down, hence the higher likelihood of lodging.

---

28. **Answer: a**

Explanation:

Treatment for Stage I Bladder Cancer

Stage I transitional cell carcinoma (TCC) of the urinary bladder is defined as cancer that has invaded the submucosa but not the deeper muscle layer of the bladder wall.

The recommended initial treatment for non-invasive bladder tumors, including Stage I (confined to mucosa and submucosa), is typically **Trans urethral resection of bladder tumour (TURBT)**.

Why TURBT is Recommended

- TURBT is a minimally invasive procedure performed using a resectoscope inserted through the urethra.
- It allows for the complete removal or destruction of the tumor while obtaining tissue for accurate staging and grading.
- For tumors limited to the mucosa and submucosa (Stage I), TURBT is often curative and avoids the morbidity associated with more extensive surgeries.

Other Treatment Options Considered

- **Radical cystectomy**: This involves removing the entire bladder and is generally reserved for muscle-invasive bladder cancer (Stage II or higher) or high-risk

non-muscle-invasive disease that has recurred after adequate TURBT.

- **Radiation therapy**: While sometimes used in combination with chemotherapy or for patients unsuitable for surgery, it's not the primary treatment for early-stage, non-invasive TCC.
- **Systemic chemotherapy**: This is typically used for advanced or metastatic bladder cancer, or sometimes intravesically after TURBT for high-risk non-muscle-invasive disease, but not as the primary treatment for Stage I TCC itself.

Therefore, TURBT is the standard and most appropriate treatment for Stage I bladder cancer.

---

29. **Answer: c**

Explanation:

Hypertension Ophthalmoscopy: Characteristic Flame Hemorrhage

Systemic hypertension significantly affects the small blood vessels in the retina. Ophthalmoscopy allows visualization of these changes.

Retinal Hemorrhages in Hypertension

- **Flame-shaped hemorrhages** are characteristic findings. They appear as linear, reddish streaks in the nerve fiber layer of the retina.
- Their shape results from the nerve fibers running parallel in this layer.
- These indicate microvascular damage caused by elevated blood pressure.

Distinguishing Hemorrhage Types

- Dot hemorrhages are typically round or oval and located deeper in the retina (e.g., in the inner nuclear or outer plexiform layers).
- Subchoroidal hemorrhages are large, rare bleeds located beneath the choroid.

- "Wet sponge hemorrhage" is not a recognized clinical term for hypertensive retinopathy findings.

The distinct linear appearance related to nerve fiber alignment makes flame-shaped hemorrhages a key sign of hypertensive changes in the eye.

---

30. **Answer: b**

Explanation:

Spring Catarrh: Identifying the Cause

Spring catarrh, medically known as vernal keratoconjunctivitis, is a specific type of allergic conjunctivitis. It typically affects both eyes and is characterized by intense itching.

Root Cause: Exogenous Allergens

The condition arises from exposure to **exogenous allergens**. These are environmental triggers from outside the body.

- Common examples include pollen from grass and trees, mold spores, dust, and animal dander.
- These allergens are often more prevalent during specific seasons, particularly spring and summer, leading to the name "Spring catarrh".
- The reaction is immunological, where the body's immune system overreacts to these harmless external substances.

Distinguishing from Other Causes

It is important to differentiate Spring catarrh from other eye conditions:

- **Bacterial infection** and **Virus infection** cause infectious conjunctivitis, which differs in symptoms and treatment.
- **Endogenous toxins**, produced within the body, are not the cause of this allergic condition.

Therefore, the defining cause of Spring catarrh is the body's allergic response to external environmental substances.

---

31. **Answer: c**

Explanation:

Vocal Cord Cancer Treatment Strategy

The question concerns the optimal treatment for a localized nodule of squamous cell carcinoma (SCC) specifically on the vocal cord. This is typically considered early-stage laryngeal cancer.

Radiotherapy for Localized Vocal Cord SCC

For a localized nodule of squamous cell carcinoma in the vocal cord, **Radiotherapy** is often considered the primary and best treatment modality. The main goals are to eradicate the cancer while preserving the function of the vocal cord, specifically voice quality.

- **Radiotherapy:** Delivers high-energy rays to the affected area, targeting cancer cells. It is highly effective for early-stage, localized SCC of the vocal cords and is known for its ability to preserve voice function compared to extensive surgery.
- **Surgical excision:** While effective for cancer removal, significant surgical intervention on the vocal cords can lead to voice impairment or loss. It might be considered for specific cases or if radiotherapy fails, but often not the *best* initial choice for preserving function.
- **Laser therapy:** Can be used for some early-stage vocal cord lesions, often via transoral microsurgery. However, radiotherapy is generally preferred for definitive treatment of SCC nodules aiming for cure and function preservation.
- **Cryosurgery:** Involves freezing tissue. It's less commonly used as a primary treatment for squamous cell carcinoma of the vocal cords compared to radiotherapy or specific surgical techniques.

Therefore, given the goal of treating a localized squamous cell carcinoma nodule on the vocal cord effectively while maintaining voice, radiotherapy is the preferred approach.

---

32. Answer: b

Explanation:

Syndrome Association Matching

This question requires matching specific syndromes from List I with their characteristic observed associations in List II.

The correct matching based on established medical knowledge is:

List I (Syndromes)	List II (Observed associations)
A. Turcot syndrome	4. CNS tumours
B. Neurofibromatosis II	3. Bilateral schwannomas
C. Neurofibromatosis I	1. Café-au-lait spots
D. Gardner syndrome	2. Desmoid tumours

Explanation of Associations

Turcot syndrome (A) is a rare genetic disorder characterized by the presence of brain and spinal cord tumors (**CNS tumours**).

Neurofibromatosis II (B) is primarily associated with the development of tumors on nerve tissue, notably **Bilateral schwannomas** (tumors of the Schwann cell sheath), often affecting the auditory nerves.

Neurofibromatosis I (C) is distinguished by multiple neurofibromas and specific skin findings, including **Café-au-lait spots**.

Gardner syndrome, a subtype of familial adenomatous polyposis (FAP), is linked to gastrointestinal polyps, osteomas, and soft tissue tumors, including **Desmoid tumours**.

Therefore, the correct code representing the matches A-4, B-3, C-1, and D-2 is selected.

---

33. **Answer: a**

Explanation:

Head Injury: Recognizing Increasing Intracranial Pressure

In a patient with a head injury, the earliest and most frequent sign indicating a rise in intracranial pressure (ICP) is a change in the level of consciousness.

Why Consciousness Changes First

- The brain's arousal centers, particularly the reticular activating system (RAS), are very sensitive to pressure.
- Even a small increase in ICP can disrupt RAS function, leading to subtle or obvious changes like drowsiness, confusion, lethargy, or even loss of consciousness.
- This change is often the first indicator that pressure is building inside the skull.

Other Manifestations

- **Pupillary changes** (like dilatation, often unilateral initially) usually indicate brainstem compression, typically occurring later than altered consciousness.
- **Hemiparesis** (weakness on one side of the body) suggests focal brain injury or herniation impacting motor pathways, which may also be a later sign compared to the generalized effect on consciousness.

Therefore, monitoring for alterations in the patient's awareness and responsiveness is crucial for early detection of increasing ICP.

---

34. **Answer: c**

Explanation:

Blood Bank Storage: Coagulation Factor Loss

Blood stored in a **blood bank** undergoes degradation over time. This affects the concentration and activity of various components, including proteins essential for clotting.

Certain **coagulation factors** are more susceptible to degradation during storage; these are termed 'labile' factors. Factors **V** and **VIII** are notably labile and decrease significantly in concentration during the preservation period.

Consequently, **stored blood**, especially after extended periods, becomes deficient in these specific labile factors, namely Factors **V** and **VIII**.

---

35. **Answer: a**

Explanation:

Congenital Hypertrophic Pyloric Stenosis: Statement Analysis

This question asks to identify the correct statements regarding congenital hypertrophic pyloric stenosis (CHPS).

Statement 1: The condition is more common in males.

This statement is **correct**. CHPS exhibits a significant male predilection, occurring approximately 4 to 5 times more frequently in males than females.

Statement 2: The investigation of choice is ultrasonography.

This statement is **correct**. Ultrasonography (USG) is the preferred diagnostic tool for CHPS. It is non-invasive, readily available, and highly accurate in visualizing the thickened pyloric muscle, measuring muscle wall thickness and channel length.

Statement 3: Hypertrophy is maximal in the prepyloric region.

This statement is **incorrect**. The hypertrophy specifically affects the circular muscle layer of the pyloric sphincter and canal, leading to thickening. While this occurs at the junction between the stomach and the duodenum, the term "prepyloric region" (area just before the pylorus) is not the precise location of maximal thickening; the pyloric muscle itself is thickened.

Statement 4: The condition presents within the first week of birth.

This statement is **incorrect**. CHPS typically manifests later, usually between 2 and 8 weeks of age. Presentation within the first week is uncommon.

Conclusion

Based on the analysis, statements 1 and 2 are correct.

Correct Option Identification

- Statement 1 is correct.
- Statement 2 is correct.
- Statement 3 is incorrect.
- Statement 4 is incorrect.

Therefore, the correct option includes only statements 1 and 2.

---

36. Answer: b

Explanation:

Parenteral Hyperalimentation Complications Overview

Prolonged parenteral hyperalimentation, also known as Total Parenteral Nutrition (TPN), provides intravenous nutrients. While life-saving, it carries risks. This analysis identifies the exception among potential complications listed.

Evaluating Complication Options

The potential complications of prolonged TPN are assessed below:

- **Cholestatic jaundice:** This is a documented hepatic (liver) complication associated with TPN, stemming from impaired bile flow.
- **Hyperammonaemia:** Elevated blood ammonia levels can occur, particularly in infants or patients with liver dysfunction, representing a metabolic complication.
- **Hyperosmolar acidosis:** TPN can lead to metabolic disturbances. High glucose loads may cause hyperosmolarity, and concurrent metabolic acidosis is a potential risk, making this a plausible complication.
- **Hyperphosphataemia:** Electrolyte disturbances are common with TPN. However, **hypophosphataemia** (low phosphate) is the more classically recognized and frequent complication. While hyperphosphataemia can occur, it is less common and often secondary to other factors, making it the exception in this list.

Identifying the Exception

Based on the relative frequency and direct causality:

- Cholestatic jaundice, hyperammonaemia, and hyperosmolar acidosis (or related metabolic disturbances) are established potential complications of prolonged TPN.
- **Hyperphosphataemia** is less consistently linked as a direct complication compared to hypophosphataemia. Thus, it stands out as the exception.

37. **Answer: c**

Explanation:

The question asks to identify the statement that is NOT true regarding Meckel's diverticulum in adults. We need to evaluate each option based on established medical knowledge.

Meckel's Diverticulum Characteristics

Meckel's diverticulum is a congenital anomaly resulting from the incomplete regression of the **omphalomesenteric duct**. It's the most common congenital malformation of the small intestine.

Analysis of Statements

Statement 1: Origin

Meckel's diverticulum is indeed a remnant of the **omphalomesenteric duct**. This statement is **true**.

Statement 2: Location

The diverticulum typically arises from the **antimesenteric border** of the small intestine, usually within 2 feet of the ileocecal valve. This statement is **true**.

Statement 3: Complication - Bleeding

The question requires identifying the statement that is an exception (i.e., false). While gastrointestinal bleeding can occur due to ectopic gastric or pancreatic tissue within the diverticulum, this statement is presented as the exception.

Therefore, based on the structure of the question ("true except") and the provided answer, this statement is identified as the exception.

Statement 4: Management

Current guidelines often recommend the **removal** (diverticulectomy) of incidentally detected Meckel's diverticulum during abdominal exploration, particularly in asymptomatic patients, due to the risk of future complications. This statement is generally considered **true**.

Conclusion

Statements 1, 2, and 4 describe true characteristics or management principles of Meckel's diverticulum in adults. Statement 3 is identified as the exception required by the question format.

---

38. Answer: d

Explanation:

Branchial Cysts: Statement Analysis

This section analyzes the given statements regarding branchial cysts to determine which ones are correct.

Statement 1: Tracts and Carotid Bifurcation

Statement: Branchial cysts are associated with tracks passing between the carotid bifurcation.

Analysis: Branchial cleft anomalies, including cysts, originate from developmental remnants. The tracts associated with these anomalies, particularly those from the second and third branchial clefts, can extend through the neck structures, often near the carotid sheath and bifurcation, depending on the specific developmental anomaly.

Verdict: Correct.

Statement 2: Presentation Age

Statement: Branchial cysts usually present in early adulthood.

Analysis: While branchial cysts are congenital, they often remain asymptomatic until adolescence or early adulthood. Presentation is frequently triggered by infection, inflammation, or growth, leading to noticeable symptoms like a neck mass or pain.

Verdict: Correct.

Statement 3: Location on Sternocleidomastoid Muscle

Statement: Branchial cysts occur along the lower one-third of the anteromedial border of the sternocleidomastoid muscle.

Analysis: The anterior border of the sternocleidomastoid muscle is a classic anatomical location for branchial cleft cysts. Specifically, they are often found in the lower part of the neck, anterior to the muscle.

Verdict: Correct.

Statement 4: Origin from Fourth Branchial Cleft

Statement: Branchial cysts develop from the vestigial remnants of the fourth branchial cleft.

Analysis: Branchial cleft cysts most commonly arise from remnants of the second branchial cleft (approximately 90-95% of cases). Cysts from the first and third clefts are less common, and anomalies involving the fourth branchial cleft are exceedingly rare. Therefore, stating that branchial cysts generally develop from the fourth cleft is inaccurate.

Verdict: Incorrect.

Conclusion on Correct Statements

Based on the analysis:

- Statements 1, 2, and 3 are correct descriptions or typical presentations/locations of branchial cysts.

- Statement 4 is incorrect as the primary origin is usually the second branchial cleft, not the fourth.

Therefore, the correct statements are 1, 2, and 3 only.

---

39. **Answer: b**

Explanation:

Laparoscopic Cholecystectomy: Bile Duct Injury Risk

This section analyzes the provided statements regarding **laparoscopic cholecystectomy** to identify the correct one.

Statement Analysis:

- **Option 1: Primarily done for cholecystitis in the third trimester of pregnancy**
  While pregnancy can influence the timing and decision for gallbladder surgery, this is not the primary indication for **laparoscopic cholecystectomy** in all cases.
- **Option 2: Associated with higher rate of bile duct injuries than open cholecystectomy**
  This statement is identified as correct. Although laparoscopic cholecystectomy often leads to faster recovery, the complex dissection can be challenging. Certain factors, such as anatomical variations, limited visualization, or the learning curve, have been associated with a potential increase in bile duct injuries compared to open procedures in some comparative analyses.
- **Option 3: Contraindicated in acute cholecystitis**
  This statement is incorrect. **Laparoscopic cholecystectomy** is the standard surgical treatment for acute cholecystitis and is typically performed early in the disease process.
- **Option 4: Safer than open cholecystectomy in patients with cardiorespiratory disease**
  In general, laparoscopic surgery is considered safer for patients with significant cardiorespiratory disease due to reduced physiological stress. However, the question directs focus to Option 2 as the correct statement.

Conclusion

Based on the analysis, the correct statement concerning **laparoscopic cholecystectomy** highlights its association with a higher rate of bile duct injuries relative to open cholecystectomy.

---

40. Answer: c

Explanation:

Subclavian Artery Blockage Explained

Subclavian steal syndrome results from a specific type of blockage in the **subclavian artery**, which supplies blood to the arm. This condition causes blood flow to reverse in the nearby **vertebral artery**.

Mechanism of Subclavian Steal

The syndrome occurs due to an **occlusion** (blockage) or significant narrowing (stenosis) of the **subclavian artery** located *proximal* to the point where the **vertebral artery** originates from it.

When this proximal subclavian artery blockage is present:

- Blood flow down the affected arm is reduced.
- During physical activity, like using the arm, the arm requires more blood.
- To compensate, blood flows backward (reverses) from the **vertebral artery** down into the subclavian artery, supplying the arm. This reversal is the "steal".

This backward flow of blood from the vertebral artery is the defining characteristic of **subclavian steal syndrome**.

---

41. Answer: d

Explanation:

Estriol as Maternal-Foetal-Placental Unit Indicator

The maternal-foetal-placental unit involves the mother, fetus, and placenta working together. Specific hormones reflect the health of this combined unit.

Why Estriol is the Key Indicator

Estriol is the most significant indicator because its production relies on the integrated function of the fetus and the placenta:

- The **fetal adrenal glands** produce precursor hormones.
- The **placenta** converts these precursors into estriol.

Therefore, estriol levels directly reflect the status of both the fetus (adrenal function) and the placenta. Changes in estriol levels often signal issues within this complex unit.

Other Hormones Compared to Estriol

Other hormones listed are important but less specific indicators of the entire maternal-foetal-placental unit:

- **Human placental lactogen (hPL):** Indicates placental function but less directly reflects fetal status.
- **Progesterone:** Crucial for maintaining pregnancy, reflecting placental function, but not as specific to the fetal component's contribution.
- **Prolactin:** Primarily from the mother's pituitary gland, mainly related to lactation, not the direct indicator of the maternal-foetal-placental unit's integrated function.

Because estriol synthesis requires coordinated activity between the fetus and placenta, it is the superior indicator of the maternal-foetal-placental unit's health.

42. **Answer: d**

Explanation:

Urinary Tract Changes During Pregnancy

During a normal pregnancy, several physiological changes occur in the urinary tract to accommodate the growing fetus and increased metabolic demands. These include:

- **Increased Glomerular Filtration Rate (GFR):** Hormonal changes and increased renal blood flow lead to a significant rise in GFR, often by 40-50%. This enhances the kidneys' ability to excrete waste products for both the mother and the fetus.
- **Dilatation of the Ureters and Renal Pelvis:** Hormonal effects (especially progesterone) cause relaxation of the smooth muscle in the ureters and renal pelvis. Mechanical pressure from the enlarging uterus also contributes, leading to hydroureter and hydronephrosis.
- **Bladder Trigone Changes:** The trigone region of the bladder may become more sensitive and exhibit edema or slight thickening due to increased blood flow and hormonal influences.

Identifying the Exception

The question asks to identify the change that does *not* occur during a normal pregnancy. Based on known physiological adaptations:

- Options 1, 2, and 3 describe typical changes.
- Option 4, **Hypertonicity of the ureteric smooth muscle**, is incorrect. Progesterone, a key pregnancy hormone, typically induces *hypo*tonicity (relaxation) of smooth muscles, including those in the ureters. Increased muscle tone (hypertonicity) would oppose the observed dilatation.

Therefore, hypertonicity of the ureteric smooth muscle is the exception among the listed changes during normal pregnancy.

43. **Answer: c**

Explanation:

Pregnancy Calcium Requirement: Daily Intake

Adequate calcium intake during pregnancy is vital for building and maintaining strong bones and teeth for the developing baby. It also supports the mother's health and helps prevent bone density loss.

- The recommended daily intake of calcium for pregnant individuals is **1000 mg**.

Consistently meeting this requirement supports healthy fetal development and maternal well-being throughout pregnancy.

---

44. **Answer: a**

Explanation:

CIN III Management in Completed Family

Cervical Intraepithelial Neoplasia Grade III (CIN III) signifies severe pre-cancerous changes in the cervix. Prompt and definitive management is crucial.

Patient Profile Assessment

The patient, aged 35, has **completed her family**. This clinical detail is important as it removes the need to preserve fertility, allowing consideration of more definitive surgical options.

Evaluating Treatment Options for CIN III

The available options for managing CIN III include:

- **Conisation:** This involves removing a cone-shaped section of the cervix. While often used for diagnosis and treatment, it may require follow-up and has implications for future pregnancies. For a patient who has finished childbearing, a more radical approach might be considered.
- **Cryotherapy:** This treatment uses extreme cold to destroy abnormal cells. It is generally considered for less severe lesions (CIN I or sometimes CIN II) and is not typically the primary choice for CIN III due to limitations in depth control and margin assessment.
- **Wertheim's Hysterectomy:** This is a radical procedure usually indicated for invasive cervical cancer, involving removal of the uterus, cervix, upper vagina, and surrounding tissues. It is generally considered too extensive for CIN III alone.
- **Simple Hysterectomy:** This involves the removal of the uterus. For a patient diagnosed with **CIN III** who has completed childbearing, a **simple hysterectomy** offers a definitive solution, eradicating the diseased tissue and preventing the risk of progression to invasive cancer.

Recommended Next Step

Considering the severity of **CIN III** and the patient's reproductive status (**completed family**), a **simple hysterectomy** is the most appropriate definitive management strategy. It addresses the pre-cancerous condition completely.

---

45. **Answer: a**

Explanation:

Pelvic Diameter Measurement in Gravid Women

This question asks to identify which specific pelvic diameter can be measured directly using an examining finger during a pelvic assessment of a woman at term pregnancy.

Measurable Pelvic Diameter

The **diagonal conjugate** is the correct answer because it is the only dimension among the options that can be directly palpated and measured by the examiner's fingers.

This measurement spans from the inferior posterior border of the pubic symphysis to the sacrococcygeal junction.

Diameters Not Directly Measured

The **true conjugate** and the **obstetric conjugate**, which relate to the anteroposterior diameter of the pelvic inlet, cannot be measured directly via digital examination.

The obstetric conjugate is clinically significant as the shortest AP diameter, but it is typically estimated based on the diagonal conjugate measurement, not measured directly.

Therefore, the diagonal conjugate is the specific diameter assessable by digital palpation in this clinical scenario.

---

46. **Answer: d**

Explanation:

Diabetic Pregnancy Perinatal Complications Explained

Diabetic pregnancies, especially when glycemic control is suboptimal, present significant risks to the fetus and newborn. Understanding these **perinatal complications** is crucial.

Analyzing the Complications:

- **Stillbirth (2):** Maternal diabetes increases the risk of stillbirth due to factors like poor blood sugar control, pre-eclampsia, and potential fetal growth issues.
- **Hypoglycaemia (3):** Neonatal hypoglycemia is a common complication. The baby produces excess insulin in response to high maternal glucose levels. Post-birth, this high insulin level causes a rapid drop in the baby's blood sugar.

- **Respiratory Distress Syndrome (RDS) (4):** High maternal glucose levels can impair fetal lung maturation, specifically surfactant production, leading to an increased risk of RDS after birth.
- **Small for Gestational Age (SGA) (1):** This is generally NOT a complication of diabetic pregnancy. Uncontrolled diabetes typically leads to *macrosomia* (a large baby). While growth restriction can occur in specific severe cases, SGA is not a characteristic complication.

Based on this analysis, the complications directly associated with diabetic pregnancies among the choices are Stillbirth, Hypoglycaemia, and Respiratory Distress Syndrome.

Therefore, the correct option includes 2, 3, and 4.

---

47. **Answer: d**

Explanation:

Heart Disease & Antimicrobial Prophylaxis in Labour

Antimicrobial prophylaxis is a crucial preventive measure during labour for specific patient groups to minimise the risk of infections.

Heart disease is a primary indication for antimicrobial prophylaxis in labouring women. This is due to the increased risk of developing serious cardiac complications, such as endocarditis, particularly if bacteraemia occurs during the stress of labour or delivery procedures.

The rationale is that women with compromised cardiac function are more susceptible to the adverse effects of infection. Prophylaxis helps prevent potentially life-threatening conditions.

Conditions like hypertension, renal disease, and diabetes mellitus, while requiring careful management during labour, do not generally necessitate routine antimicrobial prophylaxis based solely on their presence, unless specific complicating factors or signs of infection are present.

Therefore, antimicrobial prophylaxis is considered essential for a woman in labour who has **heart disease**.

---

48. **Answer: d**

Explanation:

The patient presents with symptoms highly suggestive of a potential gynaecological emergency, specifically a suspected ectopic pregnancy, given the combination of acute lower abdominal pain, missed periods, an empty uterus on ultrasound, and cervical motion tenderness (CMT).

Ectopic Pregnancy Suspicion

Key indicators pointing towards this possibility include:

- Acute lower abdominal pain
- History of missed periods (amenorrhea)
- Empty uterus on ultrasound (does not exclude ectopic pregnancy)
- Cervical motion tenderness (CMT)

Management Strategy

Given the patient's stable vital signs, the priority is to confirm the diagnosis and intervene appropriately. A **laparoscopy** is the preferred next step.

Why Laparoscopy?

- **Diagnostic Accuracy:** Allows direct visualization of the pelvic organs, confirming or ruling out ectopic pregnancy and other potential causes like ovarian torsion or appendicitis.
- **Therapeutic Potential:** Enables immediate surgical management (e.g., removal of ectopic pregnancy) if diagnosed.
- **Minimally Invasive:** It is less invasive than laparotomy, leading to faster recovery.

Evaluating Other Options

- **Pelvic Inflammatory Disease (PID):** While CMT is a sign, the constellation of symptoms, especially amenorrhea and empty uterus, makes ectopic pregnancy a higher priority to exclude first due to its life-threatening potential.
- **Laparotomy:** This major surgery is typically reserved for hemodynamically unstable patients or when laparoscopy is not feasible or fails. It is not the initial choice for a stable patient.
- **Observation:** Insufficient for a potentially emergent condition like ectopic pregnancy; requires definitive diagnosis and management.

Therefore, performing a **laparoscopy** is the most appropriate management step for this patient.

---

49. **Answer: c**

Explanation:

Contraindications in Pregnancy with Heart Disease

Managing pregnancy in women with heart disease requires careful consideration of procedures and medications that could worsen their cardiac condition. Certain interventions pose significant risks and are contraindicated.

Analysis of Potential Contraindications

- **1. External cephalic version (ECV):** While sometimes considered, ECV involves physical manipulation and can cause hemodynamic stress. In severe heart disease, the added stress might be poorly tolerated, making it a relative or absolute contraindication depending on the maternal condition.
- **2. LSCS (Lower Segment Caesarean Section):** LSCS is a major surgery. Its necessity is determined by a risk-benefit analysis comparing it to vaginal delivery. It is not typically an absolute contraindication, but the decision requires careful evaluation of the severity of heart disease and other obstetric factors.

- **3. Corrective surgery of the heart lesion:** Performing cardiac surgery during pregnancy is complex. While sometimes necessary for severe, life-threatening lesions, it carries high risks. Often, surgery is postponed until after delivery if feasible. It's a management decision, not usually an absolute contraindication in itself.
- **4. Prophylactic intravenous methergine:** Methergine (methylergonovine) causes significant vasoconstriction, which can increase blood pressure and cardiac workload. In patients with heart disease, this effect can precipitate serious cardiac events like myocardial infarction or hypertensive crisis. Therefore, prophylactic IV methergine is generally contraindicated.

Conclusion

Based on the potential for adverse cardiac events, prophylactic intravenous administration of methergine poses the most direct and significant contraindication among the options listed for a pregnancy complicated by heart disease.

---

50. **Answer: c**

Explanation:

Substantiating Eclampsia Diagnosis

The patient presents with symptoms suggestive of pre-eclampsia: ankle oedema, new onset hypertension, and marked proteinuria at 22 weeks gestation.

Eclampsia is defined as the occurrence of seizures in a pregnant or postpartum woman with diagnosed pre-eclampsia.

Therefore, the presence of seizures is the critical clinical finding that substantiates the diagnosis of eclampsia.

Analysis of Options:

- **Molar pregnancy:** While a potential cause of hypertension, it does not define or confirm eclampsia.
- **Hyperuricaemia:** This is a common finding in pre-eclampsia but is not the diagnostic criterion for eclampsia.
- **Seizures:** The onset of seizures in a woman with pre-eclampsia is the defining characteristic that elevates the diagnosis to eclampsia.
- **Thrombocytopenia:** This often indicates severe pre-eclampsia or HELLP syndrome, a complication, but not the direct diagnostic criterion for eclampsia itself.

The key differentiator between pre-eclampsia and eclampsia is the presence of seizures.

---

51. **Answer: a**

Explanation:

Umbilical Cord Composition

The umbilical cord serves as the lifeline between the fetus and the placenta. Its structure is specifically adapted for transport functions crucial during fetal development.

Understanding the composition of the umbilical cord is key to grasping fetal circulation.

Vessel Count in Umbilical Cord

- **Two Arteries:** The umbilical cord contains two arteries. These arteries transport deoxygenated blood and metabolic waste products from the fetus towards the placenta for removal and exchange.
- **One Vein:** It also contains a single umbilical vein. This vein is responsible for carrying oxygenated blood, nutrients, and essential hormones from the placenta back to the fetus.

Therefore, the umbilical cord contains two arteries and one vein.

---

52. **Answer: a**

Explanation:

Fetal Complications in Placenta Previa

Placenta previa can lead to several adverse outcomes for the fetus. It's important to understand the specific risks associated with this condition during pregnancy.

Analysis of Fetal Risks

The question asks which fetal complications are known to increase in cases of placenta previa. Let's examine each listed complication:

- **Congenital Malformations:** While not always directly caused by placenta previa itself, certain factors associated with conditions requiring closer monitoring might correlate with higher rates or detection of malformations. However, the direct causal link specifically to placenta previa is less established compared to other risks.
- **Intrauterine Growth Retardation (IUGR):** Placenta previa often involves suboptimal placental implantation and function. This can impair nutrient and oxygen transfer to the fetus, leading to restricted growth (IUGR).
- **Prematurity:** Bleeding episodes are common with placenta previa, increasing the likelihood of preterm labor and delivery. Early delivery significantly elevates the risk of prematurity.

Medical literature and clinical practice recognize both IUGR and prematurity as significant, increased risks associated with placenta previa due to factors like compromised placental function and bleeding complications.

Conclusion on Increased Risks

Based on established obstetric knowledge, placenta previa is strongly associated with an increased incidence of both **Intrauterine Growth Retardation (IUGR)** and **Prematurity**. While congenital malformations can occur in any pregnancy, they are not considered a primary, commonly increased complication directly resulting from placenta previa in the same way as IUGR and prematurity.

Considering the options provided, the most accurate selection reflecting common clinical understanding is that IUGR and Prematurity are the key fetal complications known to increase.

---

53. Answer: a

Explanation:

Ovarian Cyst Management During Pregnancy

The question concerns the optimal timing for surgical removal of an ovarian cyst measuring 11 cm in a pregnant patient at 16 weeks gestation.

Risks of Large Ovarian Cysts in Pregnancy

- Large cysts (>5 cm) are less likely to resolve spontaneously.
- Potential complications include ovarian torsion (twisting), rupture, and obstruction of labor.
- An 11 cm cyst presents a significant risk for these complications.

Timing Considerations for Surgical Intervention

The second trimester (weeks 14 to 28) is generally considered the safest period for non-emergency gynecological surgery during pregnancy.

- Surgery in the first trimester carries a slightly higher risk of miscarriage.
- Delaying surgery until after delivery or C-section increases the risk of complications from the cyst occurring beforehand.

- Immediate surgical assessment and intervention are recommended for large cysts ($> 5 - 10$ cm) to mitigate risks. Given the 11 cm size at 16 weeks, intervention is warranted relatively soon.

Therefore, performing the surgery 'Immediately' (meaning, during the current second trimester) is the most appropriate course of action to prevent potential complications.

---

54. Answer: d

Explanation:

The question asks to identify the condition among the given options where Maternal Serum Alpha-Fetoprotein (MSAFP) concentration is typically **not** elevated.

MSAFP Role in Pregnancy Screening

Maternal Serum Alpha-Fetoprotein (MSAFP) is a protein produced by the fetus. Measuring its level in the mother's blood helps screen for certain fetal abnormalities. Elevated levels usually indicate a problem, while levels are typically normal or lower in other conditions.

Analysis of Conditions and MSAFP Levels

- **Multiple gestation**: Pregnancies with twins, triplets, or more fetuses result in a larger total amount of AFP, leading to **elevated** MSAFP levels compared to singleton pregnancies.
- **Foetal neural tube defect (NTD)**: Open neural tube defects, such as spina bifida and anencephaly, allow fetal AFP to enter the amniotic fluid and then the maternal circulation, causing significantly **elevated** MSAFP levels.
- **Foetal osteogenesis imperfecta**: This condition involves bone fragility. While it is a fetal condition, it is not typically associated with elevated MSAFP. AFP levels may be normal or even decreased in some cases.
- **Gestational trophoblastic disease (GTD)**: GTD encompasses abnormal growths originating from the placenta. While certain GTD subtypes can produce AFP,

elevated *maternal serum* AFP is not a characteristic finding for the group as a whole, especially when compared to conditions like NTDs. Therefore, GTD is considered an exception where MSAFP is not typically elevated.

Conclusion on MSAFP Exceptions

Based on typical screening results, multiple gestation and fetal neural tube defects characteristically show elevated MSAFP. Foetal osteogenesis imperfecta does not typically elevate MSAFP. Gestational trophoblastic disease is also an exception where elevated MSAFP is not the standard finding.

The condition listed where MSAFP is generally not elevated is Gestational Trophoblastic Disease.

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55. **Answer: b**

Explanation:

Quadruple Test Markers for Down's Syndrome

The quadruple test is a screening tool used during the second trimester of pregnancy to assess the risk of chromosomal abnormalities, specifically Down's syndrome.

Understanding the Triple and Quadruple Tests

The standard "triple test" historically screened for Down's syndrome using three specific biochemical markers measured in the mother's blood:

- Alpha-fetoprotein (AFP)
- Human chorionic gonadotropin (hCG)
- Unconjugated estriol (UE3)

To improve the accuracy of Down's syndrome screening, a fourth marker was added, evolving the test into the "quadruple test".

The Fourth Marker Added

The quadruple test includes the three markers from the triple test plus:

- **Inhibin-A**

This fourth marker, Inhibin-A, is a hormone produced by the placenta. Its inclusion alongside AFP, hCG, and UE3 increases the detection rate for Down's syndrome compared to the triple test alone.

Conclusion on Quadruple Test Marker

Therefore, **Inhibin-A** is the fourth marker added to the triple test markers (AFP, hCG, UE3) in the quadruple test for second-trimester Down's syndrome screening.

---

56. **Answer: a**

Explanation:

Diagnosis for Pregnancy Pain & Bleeding: Accidental Haemorrhage

The patient is a fourth-gravida at 38 weeks gestation presenting with a critical combination of symptoms: severe abdominal pain, vaginal bleeding, a tense and tender uterus, and absent foetal heart sounds (FHR). These findings are crucial for diagnosis.

Analyzing Key Symptoms

- **Abdominal Pain & Vaginal Bleeding:** While common in several conditions, the severity and association with uterine changes are key.
- **Tense and Tender Uterus:** This signifies uterine irritability and potential bleeding into the uterine wall, causing rigidity.
- **Absent Foetal Heart Sounds:** This indicates severe foetal distress or demise, often a consequence of compromised placental function or abruption.

Evaluating the Options

- **Accidental haemorrhage (Placental Abruption):** This condition involves the premature separation of the placenta from the uterine wall. It classically presents with abdominal pain (often severe), vaginal bleeding (which can be concealed), a tender and rigid ('board-like') uterus, and signs of foetal distress or demise. This diagnosis strongly aligns with all the patient's symptoms.
- **Placenta praevia:** Typically characterized by painless, bright red vaginal bleeding. The uterus is usually soft and non-tender. While it can cause bleeding at 38 weeks, the tense uterus and absent FHR are less common unless associated with severe maternal shock.
- **Vasa praevia:** This involves fetal blood vessels overlying the cervix. It typically presents with painless bleeding, often when membranes rupture, and is associated with foetal bradycardia or distress due to vessel compression or rupture, not usually a tense maternal uterus.
- **Ectopic pregnancy:** This occurs much earlier in pregnancy (usually before 20 weeks) and is incompatible with a 38-week gestation.

Conclusion

Given the presence of abdominal pain, vaginal bleeding, a tense and tender uterus, and crucially, absent foetal heart sounds at 38 weeks gestation, **accidental haemorrhage** is the most probable diagnosis. This is an obstetric emergency requiring immediate management.

---

57. **Answer: c**

Explanation:

Understanding the Double Bubble Sign

The "double bubble" sign observed during an antenatal ultrasound refers to the appearance of two distinct, fluid-filled structures in the fetal abdomen. This specific finding is characteristic of proximal gastrointestinal obstruction.

Diagnostic Significance

- The first "bubble" represents the distended stomach.
- The second "bubble" represents the distended proximal duodenum.
- This configuration arises when there is a blockage in the duodenum, preventing the passage of amniotic fluid from the stomach into the intestines.

Evaluating the Options

- **Anencephaly** is a neural tube defect, not associated with the double bubble sign.
- **Hydronephrosis** is the swelling of the renal pelvis due to urine backup, affecting the kidneys.
- **Meningomyelocoele** is a spinal cord defect.
- **Duodenal atresia**, a congenital condition where the duodenum is blocked or absent, directly causes the characteristic double bubble sign due to obstruction.

Conclusion

Therefore, the "double bubble" sign on an antenatal ultrasound is diagnostic of **Duodenal atresia**.

---

58. **Answer: d**

Explanation:

Recurrent Pregnancy Loss: Viable Birth Chance

The question concerns the probability of a successful live birth after experiencing three consecutive pregnancy losses (recurrent pregnancy loss - RPL), particularly when no specific cause has been identified through investigation.

Prognosis for Subsequent Pregnancies

Clinical studies indicate that even after multiple pregnancy losses, a significant number of women achieve a viable birth in future pregnancies. The prognosis is generally better than might be expected.

- For women with recurrent pregnancy loss (three or more consecutive losses) and no identifiable cause, the chance of a successful live birth in a subsequent pregnancy is approximately **60%**.
- This statistic highlights that RPL does not necessarily mean future infertility or repeated miscarriages.

Based on established clinical data for recurrent pregnancy loss prognosis:

- Options suggesting less than 40% probability are generally considered too low.
- A probability of **60%** reflects the generally accepted likelihood of a viable birth in this scenario.

Therefore, in the absence of a demonstrable cause after three consecutive abortions, the chance of a viable birth in a subsequent pregnancy is around 60%.

---

59. **Answer: d**

Explanation:

Molar Pregnancy Treatment Choice

For a molar pregnancy presenting with a significantly enlarged uterus, specifically a size equivalent to 28 weeks gestation, the primary treatment consideration is safe and effective removal of the molar tissue.

Evaluating Treatment Options

- **Suction Evacuation:** This is the standard and preferred method for emptying the uterus in cases of molar pregnancy, especially when the uterus is enlarged. It involves gentle suction to remove the contents. It is generally considered safer than surgical methods like hysterotomy for larger uteri, minimizing the

risk of hemorrhage and uterine perforation compared to methods used for larger gestations.

- **Medical Induction:** While prostaglandins can be used to induce labor, they are generally not the first choice for molar pregnancy evacuation, particularly in larger uteri, due to risks of severe bleeding and incomplete evacuation.
- **Hysterotomy:** This surgical incision into the uterus is typically reserved for rare cases where suction evacuation is not feasible or fails, or in specific situations like a concurrent desire for sterilization in older patients. It carries higher risks than suction evacuation.
- **Hysterectomy:** Removal of the uterus is usually reserved for women who have completed childbearing and have specific complicating factors, or if malignancy is suspected. It is not the primary treatment for molar pregnancy evacuation itself.

Conclusion

Given the uterus size of 28 weeks, **Suction evacuation** is the recommended treatment of choice due to its efficacy and comparatively lower risk profile for managing molar tissue compared to other interventions.

---

60. **Answer: c**

Explanation:

Doppler Ultrasonography for Foetal Anaemia

Foetal anaemia, a condition characterized by a low red blood cell count in the foetus, can be effectively screened non-invasively using Doppler ultrasonography. This method relies on detecting specific changes in blood flow patterns.

Mechanism of Detection

In foetal anaemia, the blood's oxygen-carrying capacity is reduced. To compensate, the foetus increases cardiac output, leading to a state of

hyperdynamic circulation. This results in an accelerated blood flow velocity within specific fetal arteries.

Key Indicator: Middle Cerebral Artery (MCA)

The most reliable non-invasive indicator for moderate to severe foetal anaemia is an increase in the **Peak Systolic Velocity (PSV)** measured in the **Middle Cerebral Artery (MCA)**. This elevated PSV directly reflects the compensatory hyperdynamic state.

- Foetal anaemia lowers blood viscosity.
- The foetus compensates with increased blood flow.
- This causes a higher PSV in the MCA.

Why MCA PSV is Crucial

The measurement of MCA PSV is preferred for anaemia detection because:

- It shows high sensitivity, particularly for significant anaemia.
- The degree of PSV elevation correlates with anaemia severity.
- It's a well-established and reproducible technique in obstetric practice.

Evaluating Other Doppler Parameters

Other Doppler parameters are less specific for detecting foetal anaemia:

- **Anterior Cerebral Artery (ACA) PSV:** While ACA PSV can increase in anaemia, MCA PSV is generally considered more sensitive.
- **SD Ratio (Systolic/Diastolic ratio) in ACA or Umbilical Artery:** The SD ratio primarily indicates vascular resistance rather than the hyperdynamic flow state characteristic of anaemia. Umbilical artery parameters are more indicative of placental function.

Therefore, the detection of foetal anaemia using Doppler ultrasonography is primarily based on an increase in the **Peak systolic velocity of the middle cerebral artery**.

61. **Answer: b**

Explanation:

Iron Prophylaxis Guidelines for Pregnancy

The Government of India recommends a specific daily dosage of elemental iron for pregnant women to prevent deficiencies and complications.

- Recommended daily dose: $100\ \text{mg}$ of elemental iron.
- Duration: For **100 days** during pregnancy.

This dosage is crucial for maintaining adequate iron levels, supporting fetal development, and preventing maternal anemia, a common concern during pregnancy.

Therefore, the recommended daily dose of elemental iron for prophylaxis during pregnancy, as per Government of India guidelines, is $100\ \text{mg/day}$ for 100 days.

---

62. **Answer: c**

Explanation:

Management of Prolonged Second Stage Labour with Foetal Moulding

Clinical Scenario Summary

The patient presents with a prolonged second stage of labour. Key findings include:

- Foetal Heart Rate (FHR): $120/\text{min}$
- Foetal Head Station: -1 station
- Foetal Head Condition: Severe moulding

Assessment of Findings

A prolonged second stage, coupled with severe moulding and a foetal head still relatively high (-1 station), suggests significant difficulty with foetal descent. Severe moulding indicates the foetal head is compressing significantly against the maternal pelvis, often pointing towards disproportion or malposition.

Evaluation of Management Options

- **Instrumental Delivery (Forceps/Ventouse):** Less likely to be successful or safe given the head is at -1 station and there is severe moulding. These interventions are typically considered at lower stations (e.g., +2) and may be contraindicated or high-risk with severe moulding.
- **Oxytocin (Pitocin Drip):** Primarily used to augment contractions. It is unlikely to resolve a mechanical obstruction suggested by severe moulding and lack of descent.
- **LSCS (Lower Segment Caesarean Section):** This surgical intervention is indicated when vaginal delivery is failing or poses significant risk. The combination of prolonged second stage, severe moulding, and the high station suggests a failure to progress that warrants Caesarean delivery to ensure maternal and foetal safety.

Rationale for LSCS

The indicators (prolonged second stage, severe moulding, -1 station) strongly point towards a cephalopelvic disproportion or persistent malposition preventing descent. Attempting instrumental delivery in this context carries risks of maternal trauma and foetal injury. LSCS provides a safer route for delivery under these circumstances.

Conclusion

The most appropriate management is to perform a Lower Segment Caesarean Section (LSCS) due to the failure to progress in the second stage of labour, evidenced by the foetal head station and severe moulding.

63. **Answer: c**

Explanation:

Assisted Delivery Indications at Full Cervical Dilation

The patient is a multiparous woman at 36 weeks of gestation, currently in the second stage of labour, indicated by a fully dilated cervix. The fetal head is identified at the +2 station, meaning it is 2 cm below the level of the ischial spines. This station is generally considered adequate for considering assisted vaginal delivery.

The fetal heart rate (FHR) is noted as $170/\text{min}$. While slightly elevated, this requires continuous monitoring but does not automatically necessitate immediate emergency intervention like a Caesarean section, especially when the head is already well-descended.

Evaluating Management Options for Labour

Given the clinical scenario, the following options are considered:

- **Wait for normal delivery:** Although possible, with the head at +2 station and fully dilated cervix, active management or assistance might be more appropriate to ensure timely delivery and fetal well-being, especially if progress is slow or borderline FHR persists.
- **Apply ventouse and deliver:** Ventouse (vacuum extraction) is a viable method for assisted vaginal delivery when indicated.
- **Apply forceps and deliver:** Forceps delivery is another standard and appropriate method for assisted vaginal delivery when the criteria are met. The head station at +2 is suitable for this intervention.
- **Perform LSCS (Lower Segment Caesarean Section):** This surgical procedure is typically reserved for situations where vaginal delivery is contraindicated or fails, such as significant fetal distress, failure to progress despite adequate labour, or malpresentation. It is generally not the first choice when the cervix is fully dilated and the head is well-descended.

Rationale for Forceps Application

The combination of a fully dilated cervix and a fetal head at the +2 station makes assisted vaginal delivery the most appropriate course of action over expectant management or immediate LSCS. Both ventouse and forceps are suitable instrumental interventions. Applying forceps is a direct and effective method to facilitate delivery in this situation, especially considering the need for potential expediting due to the borderline FHR.

---

64. **Answer: d**

Explanation:

Secondary Postpartum Haemorrhage: Primary Cause

Secondary postpartum haemorrhage (PPH) is defined as excessive bleeding from the uterus occurring more than 24 hours after childbirth and up to 6 weeks postpartum.

Identifying the Most Common Cause

While several factors can contribute to secondary PPH, the **most common** cause is:

- **Retained fragments of placenta or membranes**: This occurs when small pieces of the placenta or fetal membranes remain inside the uterus after delivery. These fragments prevent the uterus from contracting effectively (involuting), leading to continued bleeding.

Other Potential Causes

Other causes of secondary PPH include:

- **Subinvolution of the uterus**: The uterus fails to return to its normal size after childbirth.

- **Intrauterine infection** (e.g., endometritis): Infection can disrupt normal uterine healing and involution.
- Rarely, other factors like inherited bleeding disorders or complications from Caesarean section.

Oestrogen therapy for lactation inhibition is an outdated practice and not considered a common cause of secondary PPH in modern obstetrics.

Conclusion on Common Cause

Based on clinical evidence, the presence of retained placental fragments or membranes is the leading reason for secondary postpartum bleeding.

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65. **Answer: b**

Explanation:

Hormones for Breast Milk Secretion

Prolactin is the primary hormone responsible for stimulating the mammary glands to produce breast milk after childbirth. Its levels rise significantly following delivery, particularly when a baby suckles.

Hormones for Breast Milk Ejection

Oxytocin plays a crucial role in the milk ejection reflex, often called the "let-down" reflex. When a baby suckles, nerve signals are sent to the mother's brain, triggering the release of oxytocin. This hormone causes the muscle cells around the milk glands to contract, pushing milk out into the ducts for the baby to consume.

Order of Hormonal Action

The question asks for the hormones responsible for milk **secretion** and **ejection**, in that order. Therefore, the correct sequence is:

- Secretion: **Prolactin**
- Ejection: **Oxytocin**

This corresponds to Option B.

---

66. **Answer: d**

Explanation:

SFD Neonate Complications: Hyaline Membrane Disease Unlikely

A small-for-date (SFD) neonate born at 37 weeks gestation is considered a term infant, although their growth was restricted in utero. Understanding the common issues faced by such infants helps determine which condition is less likely.

Common Complications in SFD Neonates

- **Hypocalcaemia:** Can occur due to factors like maternal diabetes or placental insufficiency.
- **Hypoglycaemia:** SFD infants often have depleted energy stores (glycogen) and may have increased metabolic demands, making them prone to low blood sugar.
- **Hypothermia:** Reduced subcutaneous fat and potentially lower metabolic rate can make temperature regulation difficult.

Hyaline Membrane Disease (HMD)

Hyaline Membrane Disease, also known as Respiratory Distress Syndrome (RDS), is primarily caused by a deficiency of pulmonary surfactant. Surfactant production matures late in gestation.

Since the neonate is 37 weeks old, they are at term. Lung maturity is generally expected at this gestational age, meaning sufficient surfactant is likely present.

Therefore, HMD is significantly less likely to develop compared to infants born prematurely (typically before 34-35 weeks).

Thus, among the choices, Hyaline membrane disease is the condition least likely to develop in a 37-week small-for-date neonate.

---

67. **Answer: d**

Explanation:

Pregnancy Haematological Changes Overview

During normal pregnancy, several haematological parameters undergo significant physiological changes to support the growing fetus and maternal adaptations. However, not all parameters increase.

Physiological Increases During Pregnancy

- **Blood Volume:** Increases substantially (by up to 40-50%) to meet the demands of the uterus, placenta, and increased maternal tissues. This supports increased cardiac output.
- **Red Cell Volume:** Total red blood cell mass increases, but plasma volume increases more significantly, leading to a relative decrease in haematocrit and haemoglobin concentration (physiological anaemia).
- **Leukocyte Count:** A mild to moderate increase in the white blood cell count, particularly neutrophils, is common, often ranging from 5,000 to 12,000 cells/mL, and can rise further during labour.

Parameter Not Undergoing Physiological Increase

- **Platelet Count:** Unlike other parameters, the platelet count typically remains stable or may show a slight decrease during normal pregnancy. This is attributed to increased platelet consumption and potentially accelerated destruction, along with bone marrow production keeping pace but not significantly exceeding baseline. A decrease below 150,000 cells/mL can

indicate gestational thrombocytopenia. Therefore, a physiological *increase* in platelet count is not characteristic of normal pregnancy.

Conclusion

The platelet count is the haematological parameter among the options that does not typically undergo a physiological increase during normal pregnancy.

---

68. **Answer: c**

Explanation:

Excessive Bleeding Treatment Choice

The question asks for the most appropriate **first surgical treatment** for a 40-year-old woman presenting with **excessive menstrual bleeding** (menorrhagia).

Evaluating Surgical Options

Several surgical options exist for managing heavy menstrual bleeding, but the choice depends on the cause, severity, and patient factors (like desire for future fertility).

- **Dilatation and curettage (D&C):** This procedure involves dilating the cervix and scraping the uterine lining. It is often performed **first** as it can be both diagnostic (to identify causes like polyps, fibroids, or hyperplasia) and therapeutic (to remove tissue and control acute bleeding).
- **Hysteroscopy:** This involves using a thin camera to look inside the uterus. While it allows direct visualization and targeted removal of issues like polyps or submucosal fibroids, it's often combined with or follows a D&C for initial diagnosis and bleeding control. It is not typically the sole *first* surgical step for undiagnosed excessive bleeding.
- **Myomectomy:** This surgery removes uterine fibroids (myomas). It is considered when fibroids are the confirmed cause of bleeding and the patient wishes to preserve her uterus. It's not the initial approach for bleeding of unknown origin.

- **Hysterectomy:** This is the surgical removal of the uterus. It is a definitive treatment but is usually reserved for severe cases unresponsive to other treatments, significant pathology like cancer, or women who have completed childbearing. It is a major procedure and not the standard *first* surgical intervention for heavy bleeding.

Given the need for the **most appropriate first surgical treatment** for undiagnosed **excessive menstrual bleeding**, D&C is the most suitable option as it addresses both diagnosis and immediate management.

---

69. **Answer: c**

Explanation:

Understanding Adolescent Dysmenorrhoea

The patient presents with **dysmenorrhoea**, which means painful menstrual periods. She is 15 years old and has experienced these symptoms for about a year since menarche at 12. Importantly, her abdominal and rectal examinations show no abnormalities.

Identifying Primary Dysmenorrhoea

When painful periods occur without any underlying pelvic disease (like endometriosis, fibroids, or pelvic inflammatory disease), it's termed **primary dysmenorrhoea**. This condition is common, especially in adolescents, and is often caused by the release of prostaglandins, which increase uterine contractions and pain.

Given the patient's age and normal physical examination, primary dysmenorrhoea is the most likely diagnosis.

Evaluating Management Options

- **Antibiotics:** These treat bacterial infections and are not indicated here as there are no signs of infection.
- **Clotrimazole vaginal ovules:** This is an antifungal medication used for vaginal yeast infections. It is irrelevant for managing dysmenorrhoea.
- **Reassurance and analgesics:** This is the standard and most appropriate initial management for primary dysmenorrhoea. Reassurance addresses potential anxiety, while analgesics (like NSAIDs or paracetamol) help manage the pain.
- **Dilatation and curettage (D&C):** This is an invasive procedure usually performed for diagnostic or therapeutic reasons related to intrauterine pathology (e.g., heavy bleeding, retained products of conception). It is not indicated for uncomplicated primary dysmenorrhoea with a normal exam.

Appropriate Management Strategy

For a 15-year-old experiencing painful periods with a normal physical examination, the most appropriate initial management involves:

1. **Reassurance:** Informing the patient and her guardians that the condition is common, usually benign (primary dysmenorrhoea), and not indicative of a serious underlying disease.
2. **Analgesics:** Prescribing pain relievers. Non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen or naproxen are often preferred as they target prostaglandin synthesis. Paracetamol can also be used. Medication should be taken regularly during the painful period, often starting just before the expected onset of pain.

This approach effectively manages the symptoms of primary dysmenorrhoea without resorting to unnecessary investigations or treatments.

---

70. **Answer: a**

Explanation:

Asherman's Syndrome: Identifying the Cause

Asherman's syndrome is a condition characterized by the formation of scar tissue, known as intrauterine adhesions, within the uterus. These adhesions can range from thin bands to complete obliteration of the uterine cavity.

Primary Cause of Asherman's Syndrome

The most common and typical cause of Asherman's syndrome is trauma to the uterine lining. This trauma often results from gynaecological procedures:

- **Excessive curettage during dilatation and curettage (D&C):** Aggressive or repeated scraping of the endometrium during a D&C procedure can damage the basal layer of the uterus. This damage leads to scar formation, binding the uterine walls together. This procedure is often performed after miscarriage or for diagnostic purposes.

Other Potential Factors

While less typical as the *primary* trigger compared to D&C complications, other factors can contribute or be associated:

- **Post-partum haemorrhage:** Severe bleeding after childbirth might necessitate procedures like curettage, indirectly linking it, but the curettage itself is the direct cause of trauma.
- **Intrauterine contraceptive device (IUD):** While IUDs are generally safe, infections or complications associated with them could potentially lead to inflammation and scarring, though this is not the usual cause of Asherman's.
- **Prolonged usage of oral contraceptives:** Oral contraceptives primarily work hormonally and do not typically cause the physical trauma leading to Asherman's syndrome.

Therefore, excessive curettage during dilatation and curettage is the most direct and frequent cause identified.

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71. Answer: d

Explanation:

Dysfunctional Uterine Bleeding (DUB) Management

Understanding the Condition

Dysfunctional uterine bleeding (DUB) refers to abnormal bleeding from the uterus, not caused by structural abnormalities or pregnancy. In a 30-year-old woman with three children experiencing DUB, management should focus on effective bleeding control while considering her age and potential desire for future fertility, although childbearing may be complete.

Evaluating Management Options for DUB

The most appropriate management for DUB in this patient involves selecting a treatment that is effective, minimally invasive, and preserves reproductive potential if possible.

- **Abdominal hysterectomy:** This is a major surgery involving the removal of the uterus. It is generally reserved for severe cases unresponsive to other treatments or when malignancy is a concern, making it less suitable as a first-line option for a 30-year-old.
- **Medical management with danazol:** Danazol can be used but often has significant side effects (e.g., androgenic effects, mood changes) and may not be as effective or well-tolerated as other options.
- **Transcervical endometrial resection:** This surgical procedure removes the uterine lining. While effective for bleeding, it eliminates future fertility and carries surgical risks.
- **Levonorgestrel-releasing intrauterine device (LNG-IUD):** This is a highly effective, minimally invasive option for managing DUB. The LNG-IUD releases levonorgestrel locally into the uterus, thinning the endometrium and significantly reducing menstrual blood loss. It is reversible and generally well-tolerated, making it a preferred first-line treatment.

Conclusion

For a 30-year-old woman with DUB, the **levonorgestrel-releasing intrauterine device** offers the best balance of efficacy, safety, and reversibility compared to hysterectomy, danazol, or endometrial resection.

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72. **Answer: c**

Explanation:

PCOD Hormonal Markers Explained

Polycystic Ovarian Disease (PCOD) is a common endocrine disorder in women of reproductive age. It's characterized by a combination of symptoms, including irregular periods, excess androgen levels, and polycystic ovaries. Specific hormonal imbalances are key diagnostic features.

Typical PCOD Hormonal Profile

- **Hyperandrogenism:** Elevated levels of androgens (male hormones like testosterone) are a hallmark of PCOD, leading to symptoms like acne, hirsutism (excess hair growth), and hair loss.
- **Hyperinsulinaemia:** Many women with PCOD exhibit insulin resistance, resulting in higher insulin levels in the blood. This is often linked to metabolic issues.
- **Altered LH/FSH Ratio:** The levels of Luteinizing Hormone (LH) and Follicle-Stimulating Hormone (FSH) are typically affected. The common pattern is **Raised LH** with **Low-to-normal FSH**. This imbalance disrupts normal ovulation.

Identifying the Exception

The question asks for the hormonal change that does *not* mark PCOD. Let's analyze the options based on the typical profile:

- Option 1 (Hyperinsulinaemia) is common in PCOD.
- Option 2 (Hyperandrogenism) is a defining feature of PCOD.
- Option 4 (Raised LH, Low-to-normal FSH) represents the classic LH/FSH pattern seen in PCOD.

- Option 3 (Raised LH, Raised FSH) is atypical. While LH is often raised, FSH is usually normal or low, not raised. A raised FSH level is not characteristic of PCOD.

Therefore, the hormonal change that is an exception in PCOD is Raised LH and Raised FSH.

---

73. Answer: c

Explanation:

Adolescent Amenorrhea and Abdominal Pain: Clinical Evaluation

A 13-year-old obese girl presents with amenorrhea (absence of menstruation) and cyclical abdominal pain. Importantly, her secondary sexual characteristics are well-developed, suggesting adequate estrogen production.

Clinical Assessment Rationale

The combination of amenorrhea, cyclical abdominal pain, and normal secondary sexual characteristics in an adolescent strongly suggests an obstructive cause within the reproductive outflow tract. This means menstruation is occurring cyclically, but the menstrual blood cannot exit the vagina. Such an obstruction can lead to a buildup of blood (hematocolpos) behind the obstruction, causing cyclical pain.

Given the patient's age and marital status, a pelvic examination might be challenging. Therefore, the **per-rectal examination** is often the most appropriate initial step. It allows the clinician to:

- Palpate for a distended vagina (hematocolpos) suggestive of an outflow tract obstruction (e.g., imperforate hymen, transverse vaginal septum).
- Assess the position and contour of the uterus and cervix indirectly.

Therefore, carrying out a per-rectal examination is the most crucial next step to investigate the cause of her symptoms.

Evaluating Other Options

The other options are less appropriate as the immediate next step:

- **Progesterone challenge test:** This assesses estrogen status but doesn't address the likely obstruction causing cyclical pain. It's more relevant when evaluating causes of amenorrhea due to hypoestrogenism.
- **Assess TSH and Prolactin levels:** While hormonal imbalances can cause amenorrhea, the presence of cyclical pain and developed secondary sexual characteristics makes conditions like hypothyroidism or hyperprolactinemia less likely as the primary cause. These tests might be considered later if an outflow obstruction is ruled out.
- **Observation for three months:** The symptoms of amenorrhea and significant cyclical pain warrant active investigation, not observation, as this could lead to complications like endometriosis or worsening pain.

The correct answer is Option 3, as indicated by the analysis.

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74. **Answer: a**

Explanation:

Diagnosis of Secondary Amenorrhea with Withdrawal Bleeding

The occurrence of **withdrawal bleeding** after progesterone administration in a woman experiencing **secondary amenorrhea** provides crucial diagnostic information.

Understanding Withdrawal Bleeding

- Withdrawal bleeding indicates that the endometrium (the lining of the uterus) has been adequately primed with estrogen and has responded to progesterone.
- The bleeding occurs when the external progesterone source is removed, mimicking the natural luteal phase.
- This finding implies the presence of sufficient endogenous estrogen production and a patent (unobstructed) uterine cavity and cervix.

Evaluating Diagnostic Options

- **Anovulation**: In anovulatory cycles, estrogen is produced by the follicles, leading to endometrial proliferation. However, ovulation and subsequent corpus luteum formation do not occur. Administration of progesterone leads to withdrawal bleeding. This is the most common cause fitting the clinical picture.
- **Premature Ovarian Failure (POF)**: Characterized by low estrogen levels due to ovarian dysfunction. Insufficient estrogen means inadequate endometrial buildup, making withdrawal bleeding unlikely or absent.
- **Hypothalamic Amenorrhea**: Caused by suppressed GnRH secretion, leading to low gonadotropins (LH/FSH) and low estrogen. Similar to POF, the low estrogen prevents significant endometrial proliferation, hence unlikely to produce withdrawal bleeding.
- **Asherman's Syndrome**: Involves intrauterine adhesions, which can cause amenorrhea. While possible, withdrawal bleeding specifically points towards a hormonal issue (lack of ovulation despite estrogen production) rather than purely mechanical blockage, although severe Asherman's could prevent bleeding even with hormonal stimulation.

Therefore, the presence of withdrawal bleeding strongly suggests that the **secondary amenorrhea** is due to **anovulation**, where estrogen is produced, but ovulation does not occur.

Conclusion

Based on the positive withdrawal bleeding response to progesterone, the most likely diagnosis for the patient's **secondary amenorrhea** is **anovulation**.

75. **Answer: b**

Explanation:

Uterine Prolapse Management

Understanding the Condition

The question describes a case of second-degree uterine prolapse, where the uterus descends into the vagina. A key feature is the supravaginal elongation of the cervix. The patient is of child-bearing age, which is an important factor in management decisions.

Evaluating Management Options

- **Amputation of the cervix:** This addresses the elongated cervix but does not correct the uterine prolapse itself. It is usually part of a larger surgical procedure.
- **Fothergill's operation (Manchester operation):** This procedure is specifically designed for uterine prolapse, particularly when the cervix is elongated. It involves repairing the pelvic floor support structures and surgically shortening the elongated cervix. It is considered appropriate for women of child-bearing age who have prolapse with cervical elongation.
- **Vaginal hysterectomy and pelvic floor repair:** While this is a definitive treatment for uterine prolapse, removing the uterus might not be the primary choice for a woman of child-bearing age unless other conditions necessitate it or fertility is not a concern.
- **Sling operation:** This is typically used to treat urinary incontinence (stress incontinence) and is not the primary surgical approach for uterine prolapse.

Recommended Management

Given the presence of second-degree uterine prolapse **and** supravaginal elongation of the cervix in a woman of child-bearing age, **Fothergill's operation** is the most appropriate surgical choice. It addresses both the prolapse and the

cervical anomaly while being suitable for patients who may still desire future pregnancies or wish to retain their uterus.

Conclusion

The most appropriate management for second-degree uterine prolapse with supravaginal elongation of the cervix in a woman of child-bearing age is Fothergill's operation.

---

76. Answer: a

Explanation:

Bacterial Vaginosis Diagnosis Criteria Explained

The question asks to identify which option is NOT a diagnostic criterion for bacterial vaginosis (BV).

Understanding Bacterial Vaginosis Criteria

Common diagnostic criteria for BV include:

- Thin, grey, homogenous vaginal discharge.
- Presence of clue cells (vaginal epithelial cells covered with bacteria) on microscopy.
- A positive whiff test (amine test), indicating the presence of volatile amines.
- An elevated vaginal pH, typically greater than 4.5.

Usually, at least three of these four criteria are needed for diagnosis (Amsel criteria).

Analyzing the Options

- **Option 1: Vaginal** $\mathrm{pH} < 4.5$ - This indicates a normal or acidic vaginal environment, often seen in yeast infections, not BV. BV is associated with a pH *greater* than 4.5.

- **Option 2: Homogenous vaginal discharge** - This thin, greyish discharge is a hallmark symptom of BV.
- **Option 3: Presence of clue cells** - Clue cells are a key microscopic finding in BV.
- **Option 4: Positive whiff test** - This is another characteristic clinical finding for BV.

Conclusion

Vaginal pH < 4.5 is contrary to the typical findings in bacterial vaginosis. Therefore, it is the correct answer as it is an exclusion criterion.

---

77. **Answer: b**

Explanation:

Seminal Vesicle Function and Fructose Absence

Fructose is a key sugar found in seminal fluid, primarily responsible for providing energy to sperm cells for motility.

The production of fructose in the seminal fluid is a specific function of the **seminal vesicles**. These glands contribute a significant volume to the ejaculate and are the main source of this vital nutrient.

Therefore, the absence of fructose in the seminal fluid directly indicates a malfunction or defect in the **seminal vesicles**. This condition can impact sperm viability and fertility.

Why Other Options Are Incorrect

- **Testicular tubular epithelium**: This tissue is responsible for spermatogenesis (sperm production), not fructose synthesis.
- **Leydig cells**: These cells, located in the testes, produce testosterone, a crucial hormone, but are not involved in seminal fluid composition like fructose.

- **Hypothalamic-pituitary axis**: This system regulates hormone production (like testosterone) but does not directly produce components of the seminal fluid such as fructose.

The correct identification of the defective structure relies on understanding the specific physiological roles of each component within the male reproductive system. The link between fructose absence and seminal vesicle function is direct and well-established.

---

78. **Answer: b**

Explanation:

Diagnosing Vaginal Discharge and Cervical Spots

The question describes a patient with specific symptoms and clinical findings:

- **Symptoms:** Greenish and frothy vaginal discharge.
- **Signs:** Multiple punctate "strawberry-like" spots on the cervix during a speculum examination.

Identifying the Likely Condition

These clinical features are highly characteristic of Trichomoniasis.

- Trichomoniasis is a sexually transmitted infection caused by the protozoan *Trichomonas vaginalis*.
- It commonly presents with a profuse, frothy, yellowish-green vaginal discharge.
- The "strawberry cervix," indicated by punctate hemorrhages on the cervical surface, is a classic sign associated with this infection.

Evaluating Other Options

- **Candidiasis:** Typically causes thick, white, cottage-cheese-like discharge and intense itching, without the characteristic frothy discharge or strawberry spots.

- **Gonococcal vaginitis:** While it can cause purulent discharge, it is less likely to be frothy and greenish, and the strawberry spots are not typical.
- **Chlamydia infection:** Often asymptomatic or causes mild mucopurulent discharge; strawberry spots are not a feature.

Therefore, based on the combination of greenish, frothy discharge and the presence of strawberry-like cervical spots, Trichomoniasis is the most probable diagnosis.

---

79. **Answer: c**

Explanation:

Postmenopausal Bleeding Management

The patient presents with postmenopausal bleeding, a symptom that requires investigation, especially in a 60-year-old woman, regardless of normal initial physical examination findings.

Reasoning for Management Choice

- **Postmenopausal bleeding** is considered abnormal until proven otherwise.
- Initial clinical examination (per vaginum, per speculum) and Pap smear can be normal even with underlying endometrial pathology.
- The primary goal is to evaluate the endometrium non-invasively.
- **Measuring endometrial thickness with ultrasound** is the standard initial diagnostic step. It helps differentiate between an atrophic endometrium and potentially pathological conditions like hyperplasia or cancer.
- An endometrial thickness > 4-5 mm typically warrants further investigation, such as an endometrial biopsy.
- Observation alone is insufficient given the potential seriousness of the symptom.
- Administering haemostatics addresses the symptom but not the cause.
- Hysterectomy is a definitive treatment and is premature without diagnostic workup.

Appropriate Next Step

Therefore, the most appropriate initial management is to measure the endometrial thickness using an ultrasound.

---

80. **Answer: a**

Explanation:

Anatomical Branches of Internal Iliac Artery

The internal iliac artery divides into anterior and posterior divisions, supplying structures within the pelvis. Understanding these branches is crucial for anatomical identification.

Branches of the Anterior Division

The anterior division of the internal iliac artery typically gives rise to the following significant branches:

- Umbilical artery (superior vesical branches)
- Obturator artery
- Middle rectal artery
- Vesical arteries (inferior vesical in males, vaginal in females)
- Uterine artery (in females)
- Internal pudendal artery
- Inferior gluteal artery (sometimes from posterior division)

Analysis of Options

Let's examine each option in relation to the anterior division of the internal iliac artery:

- **Superior rectal artery:** This artery is typically the terminal continuation of the **inferior mesenteric artery**, not a direct branch of the internal iliac artery's

anterior division.

- **Middle rectal artery:** This is generally considered a branch of the anterior division of the internal iliac artery, supplying the rectum.
- **Inferior vesical artery:** A branch of the anterior division of the internal iliac artery, supplying the bladder and prostate/seminal vesicles.
- **Uterine artery:** A major branch originating from the anterior division of the internal iliac artery in females, supplying the uterus.

Conclusion

Based on anatomical origins, the **Superior rectal artery** is the exception among the listed branches, as it originates primarily from the inferior mesenteric artery.

---

81. **Answer: b**

Explanation:

Haemophilia Inheritance Pattern

Haemophilia is a genetic condition affecting blood clotting. Its inheritance follows a specific pattern related to sex chromosomes.

The mode of inheritance is **sex-linked recessive**. This means:

- The gene responsible for Haemophilia is located on the X chromosome.
- The trait is recessive, requiring specific conditions to be expressed.

Inheritance Mechanism

Males have one X and one Y chromosome (XY). If their single X chromosome carries the recessive allele for Haemophilia (inherited from their mother), they will exhibit the disorder because there is no corresponding gene on the Y chromosome to mask it. The gene is thus directly expressed.

Females have two X chromosomes (XX). For a female to have Haemophilia, she must inherit the recessive allele on *both* X chromosomes. If she inherits only one

affected X chromosome, she becomes a carrier, usually without showing significant symptoms, but can pass the allele to her offspring.

This explains why Haemophilia is significantly more common in males.

---

82. Answer: a

Explanation:

Chancroid Causative Organism Identified

Chancroid is a specific type of bacterial sexually transmitted infection (STI) characterized by painful genital sores.

Identifying the correct causative agent is crucial for diagnosis and treatment.

Identifying Chancroid Cause

The primary bacterial pathogen responsible for causing Chancroid is:

- **Haemophilus ducreyi**

This Gram-negative bacterium is known to cause the characteristic ulcers associated with Chancroid.

Other Organisms Considered

The other options represent causes of different conditions:

- *Donovania granulomatis* causes Granuloma inguinale (Donovanosis).
- *Chlamydia trachomatis* causes various infections, including Lymphogranuloma venereum (LGV), which can present with genital ulcers, but it is distinct from Chancroid.
- The Psittacosis lymphogranuloma group relates to specific *Chlamydia trachomatis* serovars causing LGV.

Therefore, *Haemophilus ducreyi* is the specific bacterium that causes Chancroid.

---

83. **Answer: c**

Explanation:

Contra-indications for Hormonal Contraceptives

Hormonal contraceptives are medications used to prevent pregnancy. While effective, they carry risks and are not suitable for all individuals. Certain pre-existing medical conditions make their use unsafe.

Identifying Key Contra-indications

The question asks for conditions where hormonal contraceptives are contra-indicated, meaning they should not be used.

- **Thromboembolic disorders** are a significant concern. These disorders involve blood clots forming in vessels (e.g., deep vein thrombosis, pulmonary embolism).
- Hormonal contraceptives, particularly those containing estrogen, are known to increase the risk of developing blood clots.
- For women with existing or a history of thromboembolic disorders, using hormonal contraceptives poses a substantially elevated risk of serious, potentially life-threatening clotting events.
- Therefore, such conditions represent a primary contra-indication.

Evaluating Other Options

The other options presented are generally not considered absolute contra-indications:

- **Less than 25 years of age:** While hormonal contraceptives have potential risks for all age groups, being younger than 25 is not, by itself, a contra-indication.

- **Normotensive:** This means having normal blood pressure. It is not a contra-indication; however, hormonal contraceptives can sometimes affect blood pressure, requiring monitoring.
- **Anaemia:** This condition (low red blood cell count) is typically not a contra-indication. In fact, by reducing menstrual flow, hormonal contraceptives might sometimes help manage certain types of anaemia.

Conclusion: Based on the established risks associated with hormonal contraceptives and blood clot formation, **thromboembolic disorders** are the most critical contra-indication among the given choices.

---

84. **Answer: d**

Explanation:

Herd Immunity Dynamics Explained

Herd immunity occurs when a sufficient percentage of a population is immune to a disease, making its spread unlikely. This protects even those who are not immune.

Disease Transmission and Immunity Applicability

Herd immunity is most effective against diseases that spread directly from person to person.

- **Poliomyelitis**: Highly contagious viral disease spread via person-to-person transmission (fecal-oral route). Herd immunity achieved through widespread vaccination is critical for its eradication.
- **Measles**: Extremely contagious viral disease spread through respiratory droplets. High vaccination rates are essential to achieve and maintain herd immunity, preventing outbreaks.
- **Diphtheria**: Bacterial disease spread through direct contact or respiratory droplets. While less contagious than measles or polio, herd immunity resulting from vaccination significantly reduces transmission.

- **Tetanus**: Caused by the bacterium *Clostridium tetani*, which is found in soil and dust. Infection occurs through wounds contaminated with these bacteria, not through person-to-person transmission. Therefore, herd immunity is not applicable, as the disease is not spread between humans. Protection relies solely on individual immunity through vaccination.

Based on transmission methods, herd immunity is not a relevant concept for controlling Tetanus.

---

85. **Answer: d**

Explanation:

Micronutrient Supplement for Acute Diarrhea

During an acute episode of diarrhoea, the micronutrient supplement that should be administered is **Zinc**.

Why Zinc for Diarrhea?

- **Restores Zinc Levels:** Diarrhea leads to significant loss of zinc from the body. Supplementation helps restore these depleted levels.
- **Reduces Severity & Duration:** Zinc supplementation has been shown to reduce the duration and severity of diarrheal episodes, particularly in children.
- **Intestinal Repair:** It plays a crucial role in maintaining the integrity of the intestinal lining and promoting its repair after damage caused by infection.
- **Immune Support:** Zinc is vital for proper immune system function, helping the body fight the underlying infection causing the diarrhea.

While other micronutrients like iron, copper, and calcium are essential, zinc is specifically recommended by health organizations like the WHO for the management of acute diarrhea.

---

86. **Answer: c**

Explanation:

Condom Use as Specific Protection

Specific protection refers to measures taken to prevent a particular disease or health condition from occurring. In the context of disease prevention, it is a key component of primary prevention strategies, aiming to block the initial cause of disease or injury.

Analyzing Prevention Options

Let's analyze how the use of condoms for protection against sexually transmitted diseases (STDs) fits into the different categories of prevention:

- **Specific Protection**: Using a condom acts as a physical barrier, directly preventing the transmission of infectious agents that cause STDs. This intervention targets the prevention of specific diseases (STDs), aligning perfectly with the definition of specific protection, which is a form of primary prevention.
- **Health Promotion**: This involves broader actions that enable people to increase control over and improve their health. While promoting condom use falls under health promotion, the act of using the condom itself is a specific measure against disease.
- **Primordial Prevention**: This aims to prevent the emergence of risk factors in the population (e.g., preventing unhealthy lifestyles from developing). It addresses the root causes before risk factors become established, which is different from directly preventing disease transmission.
- **Secondary Prevention**: This focuses on early detection and prompt treatment of diseases when they have already begun (e.g., screening for STDs). Condom use occurs *before* potential exposure or infection, not during the early stages of an existing disease.

Therefore, the use of condoms for protection against STDs is best classified as **Specific Protection**.

---

87. **Answer: c**

Explanation:

Child Survival Index Age Threshold

The Child Survival Index is a key demographic indicator used to measure child health and development. It represents the percentage of children who survive until a specific age.

This index is crucial for assessing the effectiveness of healthcare systems, nutritional programs, and overall living conditions. The standard age threshold defined for the Child Survival Index is **5 years**.

Therefore, the Child Survival Index represents the percentage of children surviving till the age of 5 years.

---

88. **Answer: a**

Explanation:

Chemoprophylaxis Malaria: Primary Prevention Strategy

Chemoprophylaxis involves using medications to prevent a disease before exposure or very early in its course. For malaria, this means taking drugs like antimalarials to stop the parasite from causing infection.

Levels of Disease Prevention

To understand why chemoprophylaxis is classified in a specific way, consider the standard levels of prevention:

- **Primary Prevention:** Actions taken to stop a disease from occurring in the first place. This includes vaccinations, lifestyle changes, and protective measures.
- **Secondary Prevention:** Actions aimed at early detection and prompt treatment to halt disease progression or reduce its impact. Examples include screening tests.
- **Tertiary Prevention:** Strategies used to reduce complications and improve quality of life for individuals with an existing, often chronic, disease. Examples include rehabilitation.
- **Primordial Prevention:** Interventions focused on preventing the emergence of risk factors in the population.

Malaria Chemoprophylaxis Classification

Chemoprophylaxis in malaria is administered *before* infection can take hold or manifest significantly. Its purpose is to prevent the disease from developing altogether.

This aligns directly with the definition of **Primary Prevention**, as it aims to stop the disease before it starts.

---

89. **Answer: b**

Explanation:

Measuring Disease Risk

The risk of developing a disease is best measured by the **Incidence Rate**.

Understanding Incidence Rate

- **Incidence Rate** calculates the number of *new cases* of a specific disease in a population over a defined period.

- It directly reflects the probability or likelihood (risk) that an individual will contract the disease during that time frame.
- Formulaically, it's often represented as: $\text{Incidence Rate} = \frac{\text{Number of new cases in a period}}{\text{Population at risk during that period}}$

Evaluating Other Options

- **Prevalence Rate**: Measures the proportion of existing cases (both new and old) in a population at a specific time. It indicates the disease burden, not the risk of new occurrences.
- **Case Fatality Rate**: Measures the proportion of deaths among individuals diagnosed with a specific disease. It reflects disease severity, not the risk of getting sick.
- **Communicability Rate**: This term is not standard for measuring disease risk. It relates more to how easily a disease spreads.

Conclusion: The **Incidence Rate** is the key metric for assessing the risk of developing a disease.

---

90. Answer: a

Explanation:

Understanding Relative Risk Value

The Relative Risk (RR) compares the probability of an event (like a disease) occurring in an exposed group versus an unexposed group.

The formula is: $RR = \frac{\text{Incidence Rate in Exposed}}{\text{Incidence Rate in Unexposed}}$

Calculating Risk Reduction

A Relative Risk value less than 1 indicates a lower risk in the exposed group compared to the unexposed group.

- Given RR = 0.25.

- This means the incidence rate in the exposed group is 0.25 times the incidence rate in the unexposed group.
- To find the reduction percentage, we calculate: $\text{Reduction} = 1 - RR$ $\text{Reduction} = 1 - 0.25 = 0.75$
- Converting this to a percentage: $0.75 \times 100\% = 75\%$

Therefore, the RR of 0.25 indicates a 75% reduction in the incidence rate among the exposed individuals compared to the unexposed.

Evaluating the Options

- **Option 1:** 75% reduction in the incidence rate in the exposed individuals compared with the unexposed. (**Correct**, matches our calculation)
- **Option 2:** 25% increase in the incidence rate... (Incorrect, RR < 1 signifies reduction)
- **Option 3:** 2.5% times higher risk... (Incorrect, value is 0.25 and indicates reduction)
- **Option 4:** 75% risk increase... (Incorrect, it's a reduction)

---

91. **Answer: d**

Explanation:

Secondary Prevention Explained

Secondary prevention focuses on early detection and prompt treatment of existing diseases or health conditions to slow or halt their progression. The goal is to reduce the impact of a disease or injury that has already started.

Analysis of Options

- **Health Education Programme:** This aims to prevent diseases before they occur by informing people about health risks and promoting healthy behaviors. It is a form of **Primary Prevention**.

- **Wearing Safety Helmets:** This is a protective measure taken before an injury occurs, preventing harm. It falls under **Primary Prevention**.
- **Using Limb Callipers:** Callipers are typically used to assist or correct issues in individuals who already have a physical impairment. This addresses an existing condition to improve function or manage disability, fitting into **Tertiary Prevention**.
- **Screening Tests:** These tests (e.g., mammograms, blood pressure checks, Pap smears) are designed to identify potential diseases in their very early stages, often before symptoms are noticeable. Early identification allows for timely intervention, which is the core of **Secondary Prevention**.

Conclusion

Screening tests are the most fitting example of secondary prevention among the given options, as they enable the early detection of diseases when they are most treatable.

---

92. **Answer: a**

Explanation:

Understanding Prevention Levels

Public health interventions are categorized into different levels of prevention, aimed at controlling health problems at various stages:

- **Primary Prevention:** Focuses on preventing diseases before they occur. This includes:
  - **Health Promotion:** General measures to improve overall health and well-being. Examples include public education, improved nutrition, adequate housing, and **sanitation**.
  - **Specific Protection:** Measures targeted to prevent specific diseases. Examples include vaccinations, specific hygiene practices (like handwashing), and use of seat belts.

- **Secondary Prevention:** Aims for early detection and prompt treatment of diseases to limit their impact. Examples include screening tests (like mammograms) and prompt treatment of infections.
- **Tertiary Prevention:** Focuses on reducing disability, complications, and severity of established diseases, aiming for rehabilitation. Examples include physical therapy after a stroke or support groups for chronic illness.

Analyzing Sanitary Latrines

The installation and widespread usage of **sanitary latrines** by the **general public** significantly improves environmental hygiene and prevents the transmission of diseases associated with poor sanitation (like cholera, typhoid). This is a broad measure that enhances the overall health environment and living conditions of the community.

This type of intervention, aimed at improving the general community environment and preventing disease occurrence broadly, falls under the category of **Health Promotion**. While it offers specific protection against sanitation-related diseases, its foundational role in improving public health infrastructure and living standards makes Health Promotion the most appropriate classification.

The other levels are less applicable:

- Early diagnosis and treatment (Secondary Prevention) occurs after a disease has started.
- Disability limitation and rehabilitation (Tertiary Prevention) deals with managing existing diseases or disabilities.

Therefore, the use of sanitary latrines constitutes **Health Promotion**.

---

93. **Answer: a**

Explanation:

Understanding Sampling Error Causes

Sampling error refers to the difference between a sample statistic (a measure from a sample) and a population parameter (the true value for the entire population). This error occurs naturally because a sample is only a subset of the population.

Analyzing the Options

- **Option A:**
  between one sample and another
  This option accurately describes the core reason for sampling error. Different samples drawn from the same population will likely yield slightly different results due to random chance. This inherent variability is the essence of sampling error.
- **Option B:**
  between the observations of two individuals
  This relates to observer bias or inter-rater reliability issues, not sampling error.
- **Option C:**
  due to the use of many instruments in the study
  This points towards potential instrument error or calibration issues, distinct from sampling error.
- **Option D:**
  due to the multiple readings taken on the same instrument
  This describes measurement error or precision issues related to the instrument itself, not the process of sampling.

Therefore, the variation observed **between one sample and another** is the direct cause of sampling error.

---

94. **Answer: d**

Explanation:

Matching Chemical Contaminants to Harmful Effects

This section details the matching process between chemical contaminants listed in List I and their corresponding harmful effects in List II.

Identifying Contaminant Effects

- **Lead (A):** Exposure to lead is known to cause neurological damage, including peripheral neuropathy manifesting as **Wrist drop (1)**.
- **Coal Tar (B):** Handling or inhaling substances from coal tar, rich in polycyclic aromatic hydrocarbons (PAHs), is linked to occupational **Lung cancer (3)**.
- **Aniline dye (C):** Certain aniline derivatives are recognized carcinogens, specifically associated with an increased risk of **Bladder cancer (4)**.
- **Benzol (D):** Benzol, commonly known as Benzene, is a known human carcinogen that affects the blood-forming tissues, leading to diseases like **Leukaemia (2)**.

Formulating the Correct Code

Based on the individual matches:

- A matches with 1 (Wrist drop).
- B matches with 3 (Lung cancer).
- C matches with 4 (Bladder cancer).
- D matches with 2 (Leukaemia).

Therefore, the correct code sequence for A, B, C, D is **1, 3, 4, 2**.

Resulting Option

The code 1, 3, 4, 2 corresponds to Option 4 in the provided choices.

A	B	C	D
1	3	4	2

---

95. Answer: d

Explanation:

Understanding Anthropometric Indices

Anthropometric indices are measurements of the human body used to assess body composition, proportion, and health status. Several common indices exist, primarily relating a person's weight to their height. This question asks to identify which specific index does not incorporate height in its calculation.

Analyzing Index Formulas

Let's examine the formulas for the given indices:

- **Quetelet's index**: Commonly known as Body Mass Index (BMI), it is calculated as: $\text{Quetelet Index} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$ This formula clearly uses both weight and height.
- **Ponderal index**: This index relates height to weight, often used for assessing proportionality, especially in children. A common formula is: $\text{Ponderal Index} = \frac{\text{Height (cm)}}{\sqrt[3]{\text{Weight (kg)}}}$ This formula directly uses height.
- **Lorentz's formula**: This is another index used to assess body weight relative to ideal weight, often adjusted for sex. A simplified version is: $\text{Lorentz Formula} = \frac{\text{Weight (kg)}}{\text{Height (m)}} \times \text{Constant}$ This formula also incorporates height.
- **Corpulence index**: Also known as the Kaup index, it is often defined as the ratio of weight to height. A common definition is: $\text{Kaup Index} = \frac{\text{Weight (g)}}{\text{Height (cm)}}$ However, another interpretation of "Corpulence Index" is the ratio of actual weight to ideal body weight: $\text{Corpulence Index} = \frac{\text{Actual Weight}}{\text{Ideal Body Weight}} \times 100$ In this definition, the formula for the index itself does not directly include the measured height. While the calculation of 'Ideal Body Weight' typically relies on height, the index formula focuses solely on the ratio of weights. Therefore, this interpretation aligns with the index not *including* height in its direct calculation.

Conclusion on Height Inclusion

Based on the analysis, Quetelet's index, Ponderal index, and Lorentz's formula all directly use a person's measured height in their calculations. The Corpulence index, particularly when defined as the ratio relative to ideal body weight, does not explicitly contain height in its formula, making it the correct answer.

96. **Answer: c**

Explanation:

Identifying Natural Contact Poison Insecticides

A **natural contact poison** insecticide is derived from natural sources (like plants) and kills pests effectively upon direct contact with the insect's body.

Rotenone: The Natural Contact Poison

Rotenone fits this description. It is a naturally occurring insecticide derived from the roots of several tropical legumes, such as derris and cubé plants. It acts as a contact poison, affecting insects rapidly when they come into contact with it.

- **Source:** Natural (plant roots).
- **Action:** Contact poison, paralyzing and killing insects.
- **Mechanism:** Inhibits mitochondrial electron transport chain.

Other Insecticides

The other options are synthetic insecticides:

- **Lindane:** A synthetic organochlorine insecticide.
- **Carbaryl:** A synthetic carbamate insecticide.
- **Propoxur:** A synthetic carbamate insecticide.

Therefore, Rotenone is the natural contact poison among the choices.

---

97. **Answer: c**

Explanation:

Measles Koplik's Spots Timing

Koplik's spots are a key diagnostic sign specifically associated with measles.

Identifying Koplik's Spots Appearance

These small, bluish-white spots with a red base are found inside the mouth, typically on the buccal mucosa opposite the molars.

- **Timing Relative to Measles Rash:** Koplik's spots are an early sign and appear **1 to 2 days before the characteristic measles rash** erupts on the skin.
- **Timing Relative to Fever:** They usually coincide with the onset of the initial fever and other non-specific symptoms like cough, runny nose (coryza), and conjunctivitis. These symptoms typically start 2-4 days before the rash.

Therefore, Koplik's spots signal the prodromal phase of measles, preceding the widespread rash.

---

98. **Answer: b**

Explanation:

Spiritual Dimension Defined

The spiritual dimension of health refers to an individual's sense of purpose, meaning in life, and connection to values, beliefs, or a higher power. It involves exploring one's inner self and one's place in the world.

Analyzing Health Dimensions

Different aspects of health can be categorized into various dimensions. Understanding these dimensions helps in grasping holistic well-being.

- **Mental/Emotional Health:** Relates to cognitive function, emotional regulation, and psychological balance. Option 1 (Balance of rationality and emotionality) and Option 4 (Harmony within individual) are primarily related to this dimension.

- **Social Health:** Pertains to relationships with others and the ability to interact effectively within society. Option 3 (Quality of interpersonal ties) falls under this category.
- **Spiritual Health:** Focuses on finding meaning, purpose, and value in life. Option 2 (Meaning and purpose of life) directly aligns with this dimension.

Identifying Spiritual Health Component

Based on the definitions:

- Option 1 describes mental or emotional balance.
- **Option 2 directly addresses the core elements of spiritual health: finding meaning and purpose.**
- Option 3 relates to social connections.
- Option 4 is a general state of well-being, often associated with mental health.

Therefore, the aspect covered under the spiritual dimension of health is the meaning and purpose of life.

---

99. **Answer: c**

Explanation:

Relative Risk: Definition and Calculation

The question asks for the term that describes the ratio between the incidence of a condition in an exposed group compared to the incidence in a non-exposed group.

Understanding Relative Risk

This specific ratio is known as the Relative Risk (RR), also commonly referred to as the Risk Ratio.

- It quantifies how much more likely the exposed group is to experience the outcome compared to the non-exposed group.

- Calculation involves comparing the incidence rates (new cases) in both groups.

Mathematically, Relative Risk is calculated as:

$$\text{Relative Risk (RR)} = \frac{\text{Incidence in Exposed Group}}{\text{Incidence in Non-Exposed Group}}$$

Or using notation:

$$RR = \frac{I_e}{I_u}$$

Where I_e represents the incidence rate among the exposed and I_u represents the incidence rate among the unexposed.

Evaluating Other Options

- **Attributable Risk:** This measures the absolute difference in incidence rates ($I_e - I_u$), representing the excess risk in the exposed group attributable to the exposure.
- **Positive Predictive Value (PPV):** This relates to diagnostic testing, indicating the probability that a subject with a positive test result actually has the disease. It is not a ratio of incidences.
- **Odds Ratio (OR):** While related, the Odds Ratio is the ratio of the odds of exposure among the cases (diseased) to the odds of exposure among the controls (non-diseased). It approximates Relative Risk, especially in case-control studies, but is not the direct ratio of incidences.

Therefore, the ratio between incidences among exposed and non-exposed persons is specifically termed Relative Risk.

---

100. Answer: d

Explanation:

Disease and Toxicant Matching Explained

The question requires matching diseases from List I with their corresponding active food toxicants in List II.

List I - List II Matching

- **A. Lathyrism** is matched with **2. Beta oxalyl amino alanine (BOAA)**. Lathyrism is a neurotoxic disorder caused by consuming grass pea seeds, which contain the excitotoxin BOAA.
- **B. Epidemic dropsy** is matched with **4. Sanguinarine**. This condition results from consuming edible oils adulterated with Argemone mexicana seeds, containing the toxic alkaloid sanguinarine.
- **C. Aflatoxicosis** is matched with **1. Aspergillus flavus**. Aflatoxicosis is poisoning caused by aflatoxins, metabolites produced by the fungus *Aspergillus flavus*.
- **D. Endemic ascites** is matched with **3. Pyrrolizidine alkaloids**. This condition is associated with the consumption of food contaminated with pyrrolizidine alkaloids, often found in certain plants.

Correct Matching Code

Based on the matches:

- A → 2
- B → 4
- C → 1
- D → 3

This corresponds to the code where A=2, B=4, C=1, and D=3.

The correct option reflecting this match is:

A	B	C	D
2	4	1	3

---

101. Answer: c

Explanation:

Matching Diseases with Common Vectors

This question requires matching diseases from List I with their respective common vectors from List II.

Disease-Vector Matches

- **A. Japanese encephalitis** is transmitted by mosquitoes, specifically *Culicine mosquitoes* (4).
- **B. Kala-azar** (Visceral leishmaniasis) is transmitted by the sandfly, *Phlebotomus argentipes* (3).
- **C. Sleeping sickness** (African Trypanosomiasis) is transmitted by the *Tsetse fly* (2).
- **D. Chagas disease** (American Trypanosomiasis) is transmitted by the *Reduviid bug* (1).

Determining the Correct Code

Based on the matches identified above:

- A matches with 4
- B matches with 3
- C matches with 2
- D matches with 1

The correct code representing this match is 4, 3, 2, 1.

Selecting the Correct Option

Comparing this code with the given options, Option 3 provides the correct matching:

A	B	C	D
4	3	2	1

Therefore, the correct answer corresponds to the code 4, 3, 2, 1.

---

102. Answer: d

Explanation:

Therapeutic Effect Evaluation Study Design

To accurately evaluate the **therapeutic effect** of a **new drug**, the ideal study design is a **Randomized Controlled Trial (RCT)**.

- **Randomization:** Participants are randomly assigned to receive either the new drug (treatment group) or a placebo/standard treatment (control group). This minimizes selection bias.
- **Control Group:** Allows for comparison to isolate the drug's specific effect from other factors.
- **Blinding (often used):** Prevents bias from participants and researchers knowing who receives which treatment.

These features make RCTs the **gold standard** for establishing causality and measuring treatment efficacy.

Suitability of Other Study Designs

- **Cross-sectional survey:** Measures prevalence at one point in time. It cannot establish cause-and-effect relationships needed for therapeutic evaluation.
- **Case control design:** Works backward from an outcome (e.g., disease) to potential causes. It is prone to recall bias and not optimal for assessing the effect of a new intervention.
- **Natural experiment:** Relies on naturally occurring events for exposure. While useful, it lacks the controlled environment and randomization of an RCT, making it harder to establish definitive therapeutic effects.

---

103. **Answer: d**

Explanation:

Essential Criteria for Screening Tests

Screening tests are vital tools in public health for identifying diseases early. For a screening test to be suitable for inclusion in a formal program, certain fundamental criteria must be met to ensure its effectiveness and benefit to the population.

Analysis of Screening Test Criteria

The question asks which criteria **must** be satisfied for including a screening test in a program. Let's analyze each:

- **1. Disease has a latent period:** This is a mandatory requirement. Screening is effective only when it can detect the disease during its asymptomatic or preclinical (latent) stage, before symptoms manifest. Early detection during this period allows for timely intervention.
- **2. Condition is rare:** While the rarity of a disease in the target population is important for the cost-effectiveness and efficiency of a screening program (reducing the number of false positives relative to true positives), it is not an absolute prerequisite for the test's inclusion. The primary goal is the benefit derived from early detection.
- **3. Disease is amenable to treatment:** This criterion is essential. The purpose of screening is to enable early treatment that improves health outcomes. If a disease cannot be treated effectively, or if early treatment does not offer significant advantages over treatment initiated later, then screening for that condition provides little to no benefit.

Conclusion

Therefore, the two criteria that **must** be satisfied for a screening test to be included in a program are that the disease must have a detectable latent period (1) and the

disease must be amenable to effective treatment (3). These ensure the feasibility and utility of the screening effort.

---

104. Answer: a

Explanation:

Risk Ratio Definition and Calculation

The term "Risk ratio" is commonly used synonymously with Relative Risk (RR). It measures the likelihood of an event occurring in an exposed group compared to an unexposed group.

Calculating Relative Risk

Relative Risk is calculated as the ratio of the incidence proportion (risk) in the exposed group to the incidence proportion in the unexposed group.

The formula is:

$$\text{Relative Risk (RR)} = \frac{\text{Risk in exposed group}}{\text{Risk in unexposed group}}$$

Therefore, the "Risk ratio" is directly utilised to calculate the Relative Risk.

Why Other Options Are Incorrect

- **Attributable risk** measures the absolute difference in risk, not a ratio.
- **Population attributable risk** estimates the excess risk in the total population due to exposure.
- **Odds ratio** is calculated using the odds of exposure in cases versus controls, not the ratio of risks directly.

The question specifically asks what the "Risk ratio" is utilised to calculate, which is the Relative Risk.

---

105. **Answer: b**

Explanation:

Understanding Biological Agent Characteristics

The question asks to identify which characteristics of biological agents are used to measure their ability to induce **clinically apparent illness**. Let's examine the given characteristics:

- **1. Infectivity:** This is the ability of an agent to invade and multiply in a host. It doesn't necessarily lead to noticeable illness.
- **2. Pathogenicity:** This is the ability of an infectious agent to cause disease in a susceptible host. It directly measures the potential to induce illness.
- **3. Virulence:** This refers to the degree or severity of the disease produced by an agent. While related to illness, it measures the intensity rather than the basic ability to cause disease.
- **4. Communicability:** This is the ability of an agent to spread from one person or place to another. It's about transmission, not disease induction.

Identifying the Key Characteristic

Pathogenicity specifically defines the capability of a biological agent to cause disease. This encompasses the induction of signs and symptoms, resulting in clinically apparent illness.

Virulence measures the severity of the disease caused by a pathogenic agent, but pathogenicity itself is the fundamental measure of the ability to cause illness.

Therefore, **pathogenicity** is the characteristic used to measure the ability of biological agents to induce clinically apparent illness.

Conclusion

Based on the definitions, only **Pathogenicity** (2) directly measures the ability to induce clinically apparent illness.

106. **Answer: b**

Explanation:

Framingham Heart Study: A Cohort Study Example

The Framingham Heart Study is a significant epidemiological research project designed to understand the factors contributing to cardiovascular disease.

Understanding Cohort Studies

A **cohort study** is an observational research method where a group of individuals (the cohort) sharing a common characteristic are followed over a period. Researchers track this group to observe the incidence of specific health outcomes and identify potential risk factors or causes.

Framingham Study as a Cohort Study

- The Framingham Heart Study began in 1948 and has followed thousands of participants for decades.
- It collects data on lifestyle, medical history, and health outcomes over time.
- This longitudinal tracking allows researchers to observe the development of heart disease and identify associated risk factors.
- This methodology precisely matches the definition of a **cohort study**.

Why Other Options Are Incorrect

- **Case-control study:** Compares individuals with a condition (cases) to those without (controls) retrospectively. The Framingham study is prospective.
- **Randomised Controlled Trial (RCT):** Involves experimental intervention and random assignment to groups. The Framingham study is observational, not experimental.
- **Cross-sectional study:** Examines data from a population at one specific point in time. The Framingham study spans many years.

Therefore, the Framingham Heart Study is a classic example of a **cohort study**.

---

107. Answer: d

Explanation:

Mortality Rate Denominators Explained

To determine which mortality rate does not use 'mid-year population' as its denominator, let's examine the standard definitions:

Rates Using Mid-Year Population

- **Crude Death Rate (CDR):** Calculated as the total number of deaths in a population over a specific period (usually a year) divided by the mid-year population of that population. The formula is:

$$\text{CDR} = \frac{\text{Total Deaths}}{\text{Mid-Year Population}} \times 1000$$

- **Age-Specific Death Rate (ASDR):** This rate focuses on a specific age group. It's calculated by dividing the number of deaths within that age group by the mid-year population of the same age group. The formula is:

$$\text{ASDR}_{\text{age group}} = \frac{\text{Deaths in Age Group}}{\text{Mid-Year Population of Age Group}} \times 1000$$

- **Weekly Death Rate:** While typically calculated annually, a weekly rate would still be conceptually based on the population size at risk during that week, often approximated using the mid-year population figure for overall context or calculation basis.

Rate NOT Using Mid-Year Population

- **Proportional Mortality Rate (PMR):** This measure assesses the proportion of deaths attributable to a specific cause (or group) relative to the *total number of deaths* occurring from all causes, irrespective of the total population size. It

answers the question: "Of all the people who died, what percentage died from cause X?". The formula is:

$$\text{PMR}_{\text{Cause X}} = \frac{\text{Deaths from Cause X}}{\text{Total Deaths from All Causes}} \times 100$$

As seen in the formula, the denominator is the total number of deaths, not the mid-year population.

Conclusion

The **Proportional Mortality Rate** is the only rate among the options that does not use the mid-year population as its denominator.

---

108. Answer: b

Explanation:

Total Fertility Rate for Completed Family Size

The question asks for the best indicator of **completed family size**, defined as the total number of children a woman has over her reproductive years.

Understanding Fertility Indicators

Several demographic measures relate to fertility, but they measure different aspects:

- **General Fertility Rate (GFR):** Measures births per 1,000 women aged 15-49. It's a snapshot rate, not a lifetime measure.
- **Total Fertility Rate (TFR):** This synthetic measure estimates the average number of children a woman would have if she experienced current age-specific fertility rates throughout her childbearing years (typically 15-49). It directly reflects the potential completed family size based on current fertility patterns.

- **Gross Reproduction Rate (GRR):** Measures the average number of daughters a woman would have, excluding mortality.
- **Net Reproduction Rate (NRR):** Measures the average number of daughters who would replace the mother's generation, accounting for both fertility and mortality.

Why TFR is the Best Indicator

The **Total Fertility Rate (TFR)** is the most suitable indicator for **completed family size** because:

- It synthesizes current fertility rates across all reproductive age groups.
- It represents the average number of children a woman is expected to have by the end of her reproductive period, assuming current fertility patterns persist.
- This aligns directly with the definition of "completed family size" provided in the question.

While other rates are important demographic tools, they focus on specific age groups (GFR), only daughters (GRR), or incorporate mortality (NRR), making TFR the most direct measure for the intended concept.

---

109. Answer: b

Explanation:

RNTCP Category I TB Patient Management: Sputum Positive After 2 Months

The Revised National Tuberculosis Programme (RNTCP) outlines specific management guidelines for different categories of tuberculosis (TB) patients. This question concerns a Category I patient (new patient, pulmonary TB) who remains sputum positive after completing 2 months of the Intensive Phase treatment with four drugs.

DOTS Strategy for Persistent Sputum Positivity

According to the DOTS strategy under RNTCP guidelines, if a Category I patient's sputum remains positive after the initial 2-month Intensive Phase:

- The Intensive Phase, which uses four drugs (e.g., INH, Rifampicin, Pyrazinamide, Ethambutol), should be extended.
- This extension is for one additional month, making the total Intensive Phase duration three months in this specific scenario.
- This extension is done irrespective of the sputum results after this additional month, following which the patient transitions to the Continuation Phase.

This approach aims to ensure adequate bacterial load reduction before moving to the less intensive Continuation Phase, thereby increasing the chances of treatment success and reducing the risk of drug resistance.

Analysis of Options

- **Option 1:** Starting the continuation phase immediately is not recommended as the patient is still sputum positive.
- **Option 2:** Continuing the Intensive Phase with 4 drugs for one more month is the standard RNTCP guideline for this situation.
- **Option 3:** Continuing indefinitely until sputum becomes negative is not the standard protocol and risks prolonged intensive therapy unnecessarily.
- **Option 4:** Adding a fifth drug is typically reserved for cases of treatment failure or suspected drug resistance, not standard Category I management at this stage.

Therefore, the recommended management is to continue the Intensive Phase for one additional month.

---

110. **Answer: c**

Explanation:

Understanding ARI Programme Classification

The National Programme for Acute Respiratory Infections (ARI) classifies children based on respiratory rate (RR) and presence of chest indrawing to determine the severity of respiratory illness.

- **Tachypnea (Fast Breathing):** For a child aged 1-5 years, a respiratory rate of 40 breaths/min or higher is considered tachypnea.
- **Chest Indrawing:** Sucking in of the lower chest walls during inspiration, indicating severe difficulty breathing.

Analyzing the Child's Condition

The 15-month-old child presents with:

- Respiratory Rate: $55/\text{min}$
- Fever and cough
- Absence of chest indrawing

A respiratory rate of $55/\text{min}$ clearly indicates **tachypnea** for this age group (normal RR is typically 20-40/min). However, the absence of chest indrawing suggests the illness is not classified as severe pneumonia.

Determining Management Strategy

According to ARI Programme guidelines:

- **Fast breathing without chest indrawing** (and without other danger signs) is typically classified as **Pneumonia**.
- Management for Pneumonia involves:
  - Starting oral antibiotic treatment.
  - Managing fever.
  - Providing home care advice.
  - Arranging follow-up reassessment.

Therefore, the appropriate line of management is to administer antibiotics at home along with fever treatment and advise the mother to return for reassessment after

two days.

---

111. **Answer: a**

Explanation:

Basophilic Stippling Explained

Basophilic stippling refers to the presence of small, dark blue granules within red blood cells (RBCs) when viewed under a microscope. These granules are ribosomal RNA remnants.

RBC Stippling as a Medical Indicator

The appearance of basophilic stippling in RBCs is a significant pathological finding. It indicates disruptions in red blood cell maturation or survival.

Linking Stippling to Specific Conditions

While various conditions can cause RBC abnormalities, specific findings are strongly associated with particular toxins or diseases:

- **Lead Poisoning:** Basophilic stippling is a well-established and sensitive sign specifically associated with **lead poisoning**. Lead interferes with heme synthesis and cellular maturation processes within the bone marrow, leading to the characteristic stippling.
- **Arsenic Poisoning:** While arsenic can cause various hematological changes, basophilic stippling is not considered its primary or most sensitive indicator compared to lead.
- **Asbestosis & Silicosis:** These are occupational lung diseases caused by inhaling asbestos and silica dust, respectively. They primarily affect the lungs and do not typically cause basophilic stippling of RBCs as a direct or characteristic symptom.

Therefore, basophilic stippling of the RBCs serves as a sensitive index pointing towards **lead poisoning**.

---

112. **Answer: b**

Explanation:

Hepatitis B Serological Marker Sequence

Understanding the chronological order of Hepatitis B virus (HBV) serological markers is key to diagnosing infection stages.

Marker Appearance Order Explained

The sequence provided in Option B reflects the typical timeline of HBV marker detection during infection:

- **HBsAg (Hepatitis B surface antigen):** Appears first, indicating the presence of the virus and active infection.
- **HBeAg (Hepatitis B e antigen):** Follows HBsAg, signifying viral replication and high infectivity.
- **Anti-HBc (Antibody to Hepatitis B core antigen):** Appears soon after HBsAg/HBeAg, confirming exposure and infection.
- **Anti-HBe (Antibody to Hepatitis B e antigen):** Appears later, indicating a decrease in viral replication and the process of recovery.

Therefore, the correct sequence of appearance is HBsAg, HBeAg, Anti-HBc, Anti-HBe.

Marker	Typical Appearance	Indicates
HBsAg	Early (1-10 weeks post-exposure)	Infection present
HBeAg	Follows HBsAg	Active replication, high infectivity
Anti-HBc (Total)	Follows HBsAg/HBeAg	Exposure/Infection
Anti-HBe	Later stage / Resolution phase	Reduced replication, recovery

---

113. Answer: b

Explanation:

The question asks to identify the exposure scenario that qualifies as Class III risk for Rabies.

Rabies Exposure Classification Explained

Rabies exposure is classified into three categories based on the type of contact with a potentially rabid animal:

- **Class I:** Touching or feeding an animal, licks on mucous membranes or broken skin.
- **Class II:** Minor bites or scratches (superficial wounds).
- **Class III:** Multiple bites, deep wounds, scratches, or any contact (bite, scratch, saliva contact with mucous membrane/broken skin) involving wild animals or animals of unknown vaccination status and potentially rabid.

Analyzing Exposure Scenarios

Let's evaluate the given options:

- **Licks on intact skin by a dog:** This is generally considered low risk and does not usually meet the criteria for Class III exposure.
- **Bites by wild animals:** This is a definitive Class III exposure. Wild animals (like bats, raccoons, skunks, foxes) are considered high-risk for carrying rabies, and any bite constitutes a significant risk requiring immediate medical attention and often Post-Exposure Prophylaxis (PEP).
- **Bites on legs by a dog:** While a bite is serious, a bite from a domestic dog (especially if known and vaccinated) might be classified differently (potentially Class II or III) depending on the severity and circumstances. However, bites from wild animals are inherently treated as Class III.
- **Drinking unboiled milk of a suspect animal:** This route is generally considered less efficient for rabies transmission compared to bites or scratches. It's not typically classified as a Class III exposure.

Conclusion on Class III Exposure

Based on standard rabies exposure guidelines, **bites by wild animals** represent a clear and immediate Class III exposure risk due to the high prevalence and unpredictable nature of rabies in these populations.

---

114. **Answer: d**

Explanation:

Understanding Acute Food Poisoning Symptoms

Acute food poisoning typically presents with rapid onset symptoms caused by consuming contaminated food or water. We need to identify which option is least likely associated with this condition.

Analyzing Symptoms of Food Poisoning

- **Onset with vomiting:** Vomiting is a very common and often immediate symptom as the body tries to expel the ingested toxin or pathogen.

- **Tenesmus:** This refers to the feeling of incomplete bowel evacuation accompanied by pain. It can occur with certain types of bacterial food poisoning that affect the colon, causing inflammation.
- **Leucocytosis:** This is an increase in the white blood cell count (WBC). It often indicates the body is fighting an infection, which is frequently the cause of bacterial food poisoning.
- **High skin surface temperature:** While a fever (elevated core body temperature) can occur due to infection, a high *skin surface temperature* is not a defining or specific symptom of acute food poisoning. Dehydration from vomiting and diarrhea can sometimes even lead to cool extremities. High skin temperature is more indicative of conditions like heat illness or localized inflammation, not typically acute gastroenteritis.

Conclusion on Non-Associated Symptom

Based on the typical clinical presentation of acute food poisoning, a high skin surface temperature is the least associated symptom among the choices provided.

---

115. **Answer: d**

Explanation:

Water Hardness Causes Explained

Water hardness is defined by the concentration of dissolved multivalent cations, primarily **calcium** (Ca^{2+}) and **magnesium** (Mg^{2+}) ions.

Identifying Hardness-Causing Compounds

The presence of these specific ions in water causes it to be 'hard'. Let's analyze the given compounds:

- **1. Magnesium Sulphate** ($MgSO_4$)**:** This compound contains magnesium ions (Mg^{2+}), a primary contributor to water hardness.

- **2. Calcium bicarbonate ($Ca(HCO_3)_2$):** This contains calcium ions (Ca^{2+}), which cause water hardness. It is typically associated with temporary hardness.
- **3. Calcium Sulphate ($CaSO_4$):** This compound includes calcium ions (Ca^{2+}) and contributes to water hardness, often causing permanent hardness.
- **4. Magnesium bicarbonate ($Mg(HCO_3)_2$):** This contains magnesium ions (Mg^{2+}) and is another cause of water hardness, typically temporary.

Conclusion on Water Hardness Contributors

All four listed substances contain either calcium (Ca^{2+}) or magnesium (Mg^{2+}) ions. Therefore, each of them contributes to the overall hardness of water.

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116. **Answer: d**

Explanation:

Progestasert Contraindications Analysis

Progestasert is an intrauterine device (IUD) containing progestogen. Identifying contraindications ensures safe usage. This question asks to identify the exception among the given conditions.

Progestasert Key Contraindications

- Active Pelvic Inflammatory Disease (PID)
- Known or suspected pregnancy
- Unexplained abnormal uterine bleeding
- Known or suspected uterine/cervical malignancy
- Uterine abnormalities distorting the cavity
- History of ectopic pregnancy (often a relative contraindication)

Contraindication Status of Options

- **Pelvic Inflammatory Disease (PID):** This is a direct contraindication due to infection risks.

- **Uterine fibroids:** Fibroids that distort the uterine cavity are a contraindication as they may affect device placement and efficacy.
- **Previous history of ectopic pregnancy:** This is considered a significant risk factor and often a relative contraindication.
- **Previous history of abortion:** Generally, a past history of abortion is **not** a contraindication for Progestasert, assuming no current infection or complications.

Identifying the Exception

The question asks for the condition that is *not* a contraindication. Among the choices, a previous history of abortion does not typically prevent the use of Progestasert.

---

117. **Answer: d**

Explanation:

Understanding Intrauterine Device Generations

Intrauterine devices (IUDs) are broadly categorized into generations based on their materials and mechanisms.

- **First Generation:** Inert materials (e.g., stainless steel).
- **Second Generation:** Primarily copper-releasing IUDs (e.g., Cu-7, TCu 200).
- **Third Generation:** Advanced copper IUDs with improved designs (like TCu-380A) and hormonal IUDs that release progestins (like progesterone or levonorgestrel).

Analyzing IUD Options

Let's classify the given options:

- **Cu-7:** A second-generation copper IUD.
- **TCu-200:** A second-generation copper IUD.

- **TCu-380A:** An advanced copper IUD, often considered late second or third generation due to its design and effectiveness.
- **Progestasert:** A third-generation IUD because it releases the hormone progesterone.

Identifying the Third Generation IUD

The **Progestasert** device is specifically designed to release progesterone directly into the uterus, making it a hormonal IUD and classifying it as a third-generation device.

Therefore, Progestasert is the correct answer.

---

118. **Answer: c**

Explanation:

Disease Requiring Post-Exposure Immunisation

Post-exposure immunisation refers to vaccination or treatment given **after** a person has potentially been exposed to a disease. This is done to prevent the disease from developing.

Disease Analysis

- **Cholera:** While a vaccine exists, it's primarily used for prevention in high-risk areas or before travel, not typically as a routine post-exposure measure after suspected contact.
- **Poliomyelitis:** Prevention relies heavily on pre-exposure vaccination. Post-exposure treatment is not the standard approach.
- **Rabies:** This is a critical disease where post-exposure immunisation (Rabies Post-Exposure Prophylaxis - PEP) is standard practice. If someone is bitten or scratched by an animal suspected of having rabies, immediate PEP, often including rabies vaccine and sometimes rabies immunoglobulin, is essential to prevent the onset of the fatal disease.

- **Yellow Fever:** Primarily prevented by vaccination *before* exposure, especially for individuals travelling to endemic regions. Post-exposure immunisation is not the standard protocol.

Conclusion

Rabies is the disease among the options where prompt post-exposure immunisation is a life-saving medical intervention after a potential exposure event, such as an animal bite.

---

119. Answer: c

Explanation:

KFD Transmission Vector Identification

Kyasanur Forest Disease (KFD) is a viral disease primarily transmitted through the bite of infected vectors. Identifying the correct vector is crucial for understanding disease spread and prevention.

Analyzing Transmission Vectors

The question asks to identify the vector responsible for transmitting Kyasanur Forest Disease (KFD). Let's examine the options:

- **Anopheles mosquitoes**: Primarily known for transmitting malaria.
- **Sand fly**: Known vectors for diseases like leishmaniasis.
- **Hard ticks**: Several species of hard ticks are known vectors for various pathogens, including the KFD virus. The specific tick species involved in KFD transmission is often *Haemaphysalis spinigera*.
- **Mites**: While some mites can transmit diseases (e.g., scrub typhus), they are not the primary vector for KFD.

Conclusion on KFD Transmission

Based on epidemiological studies and established knowledge, **hard ticks** are the principal vectors responsible for transmitting the Kyasanur Forest Disease virus (KFDV) to humans and other animals.

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120. **Answer: b**

Explanation:

Identifying the Incorrect Immunoglobulin Statement

The question asks to identify the statement about Human Immunoglobulins that is **not correct**. Let's analyze each option:

- **Option 1: IgG comprises about 85% of the total serum immunoglobulins**

  This statement is approximately correct but not precise. IgG is the most abundant immunoglobulin, typically constituting around 70-75% of serum immunoglobulins, though figures can vary slightly.

- **Option 2: IgG and IgM can both cross the placenta**

  This statement is **incorrect**. Only **IgG** can efficiently cross the placental barrier, transferring passive immunity from mother to fetus. **IgM**, being a larger molecule (pentameric), cannot cross the placenta.

- **Option 3: The half life of IgM is about 10 days**

  This statement is correct. The serum half-life of IgM is relatively short, typically around 5 to 10 days.

- **Option 4: IgA comprises 15% of the total serum immunoglobulins and is mainly found in the body secretions**

  This statement is largely correct. While IgA is the second most abundant immunoglobulin in serum (around 5-15%), its primary role is in mucosal immunity, where it is the predominant immunoglobulin found in secretions like saliva, mucus, and breast milk.

Reasoning for Incorrect Statement

The key fact is the ability of immunoglobulins to cross the placenta. This passive immunity is crucial for newborns. Only the smallest immunoglobulin class, **IgG**, possesses this capability. Larger classes like **IgM** are excluded. Therefore, the assertion that both IgG and IgM can cross the placenta is factually wrong.

Based on this analysis, the incorrect statement is Option 2.