

NEET-PG Forensic Medicine Sample Paper-9

Duration: 10 Minutes

Maximum Marks: 40

Instructions

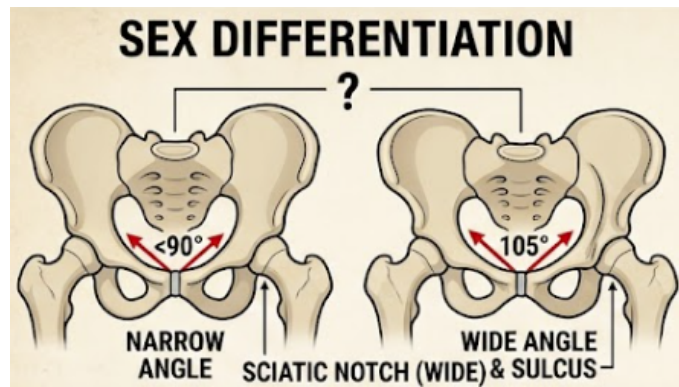
- This paper contains **10** Multiple Choice Questions.
- Each correct answer carries **+4** mark. Incorrect answer: **-1** marks. Only **one** correct option.
- Unattempted questions carry **0** marks.
- Use of mobile phones, smartwatches, or any electronic gadgets is strictly prohibited.

Q1. A 32-year-old married woman is brought to the emergency department with severe abdominal pain, vomiting, and a smelling breath resembling garlic. On examination, she has dynamic tremors, hyperpigmentation of the skin, and peripheral neuropathy. Her husband states she accidentally consumed a rodenticide. Which of the following legal sections is automatically invoked for a mandatory judicial inquiry by a Magistrate into the cause of her condition if she succumbs within 7 years of marriage?

- (A) Section 174 CrPC
- (B) Section 176 CrPC
- (C) Section 304B IPC
- (D) Section 498A IPC

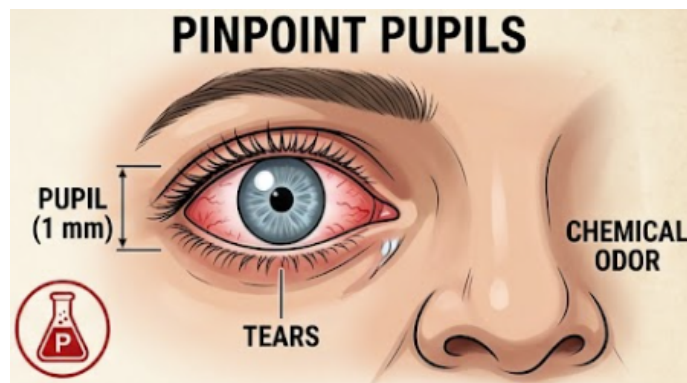
Q2. During an autopsy of an unidentified skeletal remain, the forensic pathologist observes that the sub-pubic angle is 105° , the sciatic notch is wide and shallow, and the pre-auricular sulcus is deep and well-developed. Additionally, the sacrum is short, wide, and flat. Which of the following is the most accurate conclusion regarding the identity?





- (A) The remains belong to an adult male.
- (B) The remains belong to an adult female.
- (C) The remains belong to a prepubertal male.
- (D) The features are indeterminate for sex differentiation.

Q3. A 45-year-old farmer is brought dead to the mortuary. He was last seen spraying pesticides in his field without any protective gear. During the post-mortem examination, the pathologist notices intense pinpoint pupils, marked pulmonary edema, and a distinct chemical, kerosene-like odor emanating from the gastric contents. What is the primary mechanism of toxicity for the suspected agent?



- (A) Reversible inhibition of monoamine oxidase
- (B) Irreversible inhibition of acetylcholinesterase
- (C) Competitive antagonism at NMDA receptors
- (D) Activation of voltage-gated sodium channels

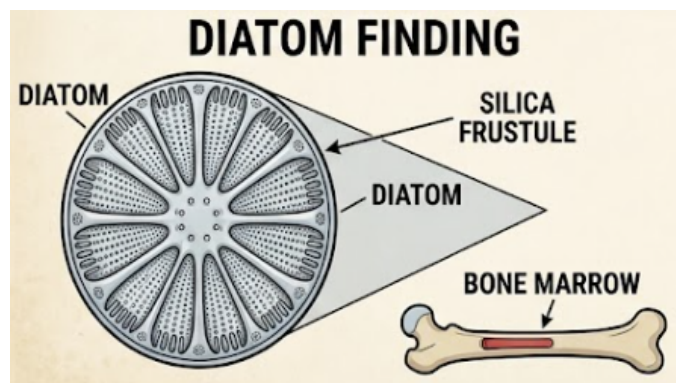
Q4. A first-year postgraduate resident in surgery receives a subpoena from a Court of Session to appear as a medical witness. Due to an emergency major trauma case,



the resident fails to attend the court hearing without prior intimation or lawful excuse. Under which section of the Indian Penal Code (IPC) can the resident be prosecuted for intentional omission to attend?

- (A) Section 174 IPC
- (B) Section 177 IPC
- (C) Section 181 IPC
- (D) Section 193 IPC

Q5. A dead body is recovered from a well. During autopsy, the medical officer notes the presence of fine, white, leathery, copious froth at the mouth and nostrils, which increases on pressing the chest. Furthermore, the lungs are voluminous, pale, doughy, and retain indentation marks when pressed. Cut sections of the lungs show exuding fluid mixed with air bubbles. Which of the following findings would conclusively differentiate this as a case of ante-mortem drowning rather than post-mortem immersion?



- (A) Presence of water in the stomach and small intestine
- (B) Presence of diatoms in the bone marrow of intact long bones
- (C) Pronounced washerwoman's hands and feet
- (D) Identification of hypostasis on the head, neck, and upper chest

Q6. A 28-year-old chronic psychiatric patient is rushed to the hospital with history of consuming an unknown plant substance. He presents with dry mouth, extreme thirst, flushed hot skin, dilated sluggish pupils, a rapid thready pulse, and delirium with characteristic "thread-picking" movements. The emergency



physician suspects *Datura* poisoning. Which of the following pharmacological agents serves as the specific antidote of choice to reverse the central nervous system manifestations?

- (A) Neostigmine
- (B) Atropine sulfate
- (C) Physostigmine salicylate
- (D) Pralidoxime

Q7. A 34-year-old male is brought to the casualty with a history of consuming a heavy dose of a popular hypnotic drug. He is comatose with slow, shallow respirations, hypothermia, and hypotension. On physical examination, distinct bullous lesions (coma blisters) are noted over the skin at pressure points like the knees and ankles. A screening toxicology profile confirms Barbiturate poisoning. What is the most effective therapeutic intervention to enhance the renal elimination of this drug?

- (A) Forced acid diuresis using ammonium chloride
- (B) Forced alkaline diuresis using sodium bicarbonate
- (C) Continuous peritoneal dialysis
- (D) Administration of activated charcoal alone without fluid therapy

Q8. A qualified medical practitioner performs an emergency medical termination of pregnancy (MTP) on a 17-year-old unmarried girl at a registered government hospital. The procedure was carried out with the written informed consent of the girl alone, who explicitly requested that her parents not be informed. Under the Medical Termination of Pregnancy Act and the Protection of Children from Sexual Offences (POCSO) Act, which of the following statements represents the correct legal status of the practitioner's action?

- (A) The practitioner is fully protected as the MTP was done in a registered government facility.
- (B) The practitioner is legally liable because consent of the guardian is mandatory for a minor under the MTP Act.

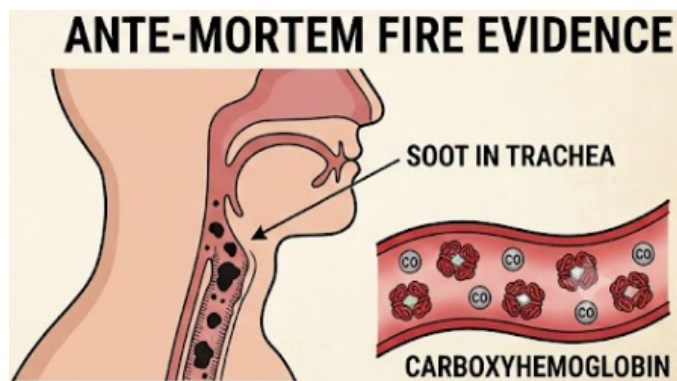


- (C) The practitioner is exempted from reporting under the POCSO Act to maintain patient-doctor confidentiality.
- (D) The practitioner can terminate the pregnancy but must report the matter under the POCSO Act as it involves a minor.

Q9. An autopsy is conducted on a 60-year-old individual who collapsed suddenly at home. On external examination, the dependent parts of the body show a deep, uniform, cherry-red colored post-mortem lividity. Which of the following conditions or toxins is most characteristically associated with this specific hue of hypostasis?

- (A) Hydrocyanic acid poisoning
- (B) Carbon monoxide poisoning
- (C) Phosphorus poisoning
- (D) Nitrite poisoning

Q10. During the medicolegal autopsy of a body retrieved from a house fire, the pathologist needs to distinguish whether the deceased was alive or dead when the fire started. Which of the following combinations of post-mortem findings strongly validates an ante-mortem burn injury?



- (A) Presence of soot particles in the deeper respiratory passages and carboxyhemoglobin in the blood
- (B) Hard, blackened, charred skin with extensive "heat fractures" of the long bones
- (C) Pugilistic attitude of the limbs and shrinkage of internal viscera
- (D) Post-mortem epidural hematoma with a jelly-like consistency



Detailed Solutions**Q1.****Solution****Concept:**

The legal framework surrounding unnatural deaths of women within 7 years of marriage involving cruelty or harassment for dowry is governed by specialized penal provisions. With the replacement of the Indian Penal Code (IPC) by the Bharatiya Nyaya Sanhita (BNS), 2023, the classic penal sections have been rearranged into a new statutory hierarchy.

Solution:

Step 1: Analyze the clinical and circumstantial data provided. The victim is a 32-year-old married woman who died under suspicious circumstances within 5 years of marriage (which is within the statutory 7-year window) with a clear, documented history of domestic physical abuse linked directly to dowry demands.

Step 2: Under the old Indian Penal Code, this offense was registered under Section 304B (Dowry Death). However, with the enforcement of the Bharatiya Nyaya Sanhita (BNS), 2023, the criminal laws have been overhauled.

Step 3: Map out the relevant sections of the new BNS, 2023. Section 79 of the BNS explicitly defines and penalizes the offense of "Dowry Death," effectively replacing Section 304B of the old IPC.

Step 4: Evaluate the other options to rule out mismatches. Section 80 of the BNS deals with abetment of suicide of a child or insane person. Section 85 of the BNS relates to cruelty by a husband or relatives of the husband (formerly Section 498A IPC). Section 304B is the legacy IPC section and is no longer the primary active section for registering new cases under the current BNS framework.

Step 5: Therefore, the primary section under which the police must register this specific case of dowry death under the modernized penal code is Section 79 of the BNS.

Final Answer:

Answer: (D)

[Go Back to Question 1](#)



Q2.

Solution**Concept:**

Heavy metal toxicity manifests through specific clinical signs, such as gastrointestinal distress, neurological deficits, and hematological abnormalities. Effective management relies on selecting a specific chelating agent that possesses optimal binding affinities for the toxic metal ion, forming stable, non-toxic, water-soluble complexes that can be readily excreted by the kidneys.

Solution:

Step 1: Identify the toxic agent from the patient's presentation. The combination of severe abdominal colic (lead colic), peripheral neuropathy manifesting as wrist drop due to demyelination, a dark blue-black line along the margins of the gums (Burtonian line), and punctate basophilic stippling of red blood cells on peripheral smear is pathognomonic for chronic lead poisoning (plumbism).

Step 2: Review the specific therapeutic properties of the available chelators. For severe or symptomatic lead poisoning in adults, the primary choice is a chelating agent that effectively binds extracellular lead ions.

Step 3: Evaluate Calcium disodium EDTA (CaNa_2EDTA). This agent works by displacing its calcium ion for lead, forming a highly stable, soluble chelate that is excreted in the urine. It is the established first-line treatment for lead encephalopathy and severe lead poisoning in adults, often combined with BAL in extreme cases.

Step 4: Differentiate from other choices. British Anti-Lewisite (BAL) is used for arsenic, mercury, and gold poisoning, and as an adjunct in severe lead poisoning, but not typically as a standalone first-line agent when EDTA is indicated. Desferrioxamine is an iron-chelating agent used for acute iron poisoning or chronic iron overload. Penicillamine is an oral agent used primarily for copper chelation in Wilson's disease or low-level chronic lead poisoning, but is not the preferred first-line agent for acute, severe occupational presentations.

Step 5: Thus, Calcium disodium EDTA stands out as the most appropriate first-line targeted therapeutic agent for this presentation.

Final Answer:

Answer: (D)

[Go Back to Question 2](#)



Q3.

Solution**Concept:**

Distinguishing between an individual who was alive during a fire (antemortem exposure) and a body placed in a fire after death (postmortem exposure) is a crucial task in forensic pathology. This relies heavily on detecting active physiological processes, such as respiration and systemic circulation, which cease immediately upon death.

Solution:

Step 1: Evaluate the first major autopsy finding: the presence of soot particles deep within the lumen of the trachea and major bronchi. For soot to penetrate deeply into the lower respiratory tract, active, deep inspiratory efforts must have occurred. Postmortem passive deposition of smoke cannot reach these deeper divisions of the respiratory tree.

Step 2: Evaluate the second major autopsy finding: the distinct cherry-red discoloration of the post-mortem lividity. This coloration is due to the formation of carboxyhemoglobin (COHb), which occurs when carbon monoxide (CO) gas generated during incomplete combustion is actively inhaled and binds to hemoglobin in circulating red blood cells.

Step 3: Synthesize these observations. The combination of deep respiratory soot inhalation and systemic distribution of carboxyhemoglobin conclusively proves that the individual was alive and breathing in the smoky, toxic atmosphere of the fire.

Step 4: Exclude alternative explanations. If the individual had been dead before the fire started, the respiratory tract would be clear of soot below the vocal cords, and the carboxyhemoglobin levels would not be elevated to cause widespread cherry-red lividity. Cyanide poisoning can cause a bright pink or cherry-red discoloration, but it would not account for the inhalation of soot deep into the respiratory system.

Step 5: Therefore, these specific findings firmly indicate that the individual was alive during the fire and inhaled smoke.

Final Answer:

Answer: (B)

[Go Back to Question 3](#)



Q4.

Solution**Concept:**

The autonomic toxidrome resulting from agricultural pesticide exposure involves the hyperstimulation of the parasympathetic nervous system. Understanding the biochemical target of these compounds explains the rapid onset of muscarinic and nicotinic overactivity seen clinically.

Solution:

Step 1: Analyze the patient's classic toxidrome. The clinical presentation includes profuse sweating (diaphoresis), pinpoint pupils (miosis), generalized muscle fasciculations, and a prominent garlic-like odor on the breath. These signs are highly characteristic of acute poisoning by organophosphate compounds or carbamates, which are common agricultural pesticides.

Step 2: Examine the molecular mechanism of organophosphate toxicity. Organophosphates bind to the active site of the enzyme acetylcholinesterase (AChE) at nerve synapses and neuromuscular junctions.

Step 3: This binding results in the phosphorylation and subsequent irreversible inhibition of acetylcholinesterase. As a consequence, the enzyme can no longer hydrolyze the neurotransmitter acetylcholine (ACh) into choline and acetic acid.

Step 4: The failure to degrade acetylcholine leads to its continuous accumulation within the synaptic cleft. This produces excessive and unremitting stimulation of both muscarinic receptors (causing miosis, sweating, salivation, and bradycardia) and nicotinic receptors (causing muscle twitching, fasciculations, and eventual paralysis).

Step 5: Compare with other mechanisms. It does not involve monoamine oxidase inhibition, voltage-gated sodium channel activation, or competitive antagonism at muscarinic receptors (which would cause an anticholinergic syndrome, the exact opposite of this presentation). Thus, the core mechanism is the irreversible inhibition of acetylcholinesterase.

Final Answer: Irreversible inhibition of acetylcholinesterase

Answer: (B)

[Go Back to Question 4](#)



Q5.

Solution**Concept:**

Forensic anthropology utilizes specific skeletal morphology to establish biological profile components like sex, age, and stature. The pelvis and the skull provide the highest accuracy for sex determination due to the evolutionary adaptations of the female skeleton for childbirth and the greater muscular ruggedness typically found in the male skeleton.

Solution:

Step 1: Examine the provided pelvic characteristics. A deep and narrow greater sciatic notch is highly characteristic of male pelvic anatomy, whereas females present with a wide and shallow notch. An acute subpubic angle ($\theta < 70^\circ$) is a classic male feature, contrasting with the wide, obtuse subpubic angle ($\theta > 90^\circ$) found in females. The oval-shaped obturator foramen also aligns with male anatomy, while it tends to be more triangular in females.

Step 2: Analyze the cranial characteristics presented. Prominent, heavy supraorbital ridges (brow ridges) and a large, well-developed, blunt mastoid process are reliable indicators of male skeletal robustness, driven by testosterone-mediated bone remodeling during and after puberty.

Step 3: Correlate all findings. Both the pelvic metrics (which carry the highest diagnostic accuracy for sex determination, around 90–95%) and the cranial features consistently point in the same direction without any conflicting markers.

Step 4: Eliminate alternative options. The skeleton does not show the typical wide, spacious, and non-rugged characteristics of a female pelvis, nor are there any intermediate or contradictory features to suggest an indeterminate or intersex status.

Step 5: Conclude that based on the uniform expression of robust cranial and narrow pelvic traits, the biological sex is male.

Final Answer:

Answer: (A)

[Go Back to Question 5](#)



Q6.

Solution**Concept:**

The legal provisions regulating the mandatory medical examination of an accused individual by a registered medical practitioner are strictly codified to protect constitutional rights while facilitating criminal investigations. With the implementation of the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, traditional sections of the Code of Criminal Procedure (CrPC) have been mapped to new equivalents.

Solution:

Step 1: Identify the nature of the legal request. The scenario involves a medical examination of an accused person conducted by a registered medical practitioner at the request of a police officer or under directive to assist an ongoing criminal investigation.

Step 2: Recall the legacy statutory provision. Under the Code of Criminal Procedure, 1973, Section 53 explicitly empowers a police officer to request a registered medical practitioner to conduct a medical examination of an accused person using reasonable force if necessary to locate evidence.

Step 3: Map this legacy section to the newly enacted Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023. Section 53 of the old CrPC has been structurally transitioned into Section 51 of the BNSS, 2023.

Step 4: Analyze alternative sections to confirm accuracy. Section 164A of the CrPC (now Section 184 of the BNSS) specifically governs the medical examination of a victim of rape, which requires explicit informed consent and follows a separate administrative protocol. Section 311 of the CrPC relates to the power of the court to summon material witnesses, and Section 45 of the Indian Evidence Act concerns expert witness testimony (now under the Bharatiya Sakshya Adhinyam, BSA).

Step 5: Therefore, the specific legal framework governing the medical examination of an accused person at the instance of the investigating agency is Section 53 CrPC / Section 51 BNSS.

Final Answer:

Answer: (A)

[Go Back to Question 6](#)



Q7.

Solution**Concept:**

Toxicity from deliriant toxic plants results from competitive blockade of muscarinic acetylcholine receptors, both peripherally and centrally. Reversing severe central nervous system toxic manifestations requires a specific antidote capable of crossing the blood-brain barrier to elevate synaptic acetylcholine levels.

Solution:

Step 1: Diagnose the underlying clinical syndrome. The patient presents with classic signs: acute delirium, dry and flushed skin, tachycardia, fixed dilated pupils (mydriasis), and hyperthermia. This cluster of signs represents a classic anticholinergic toxidrome, often summarized as "mad as a hatter, dry as a bone, red as a beet, blind as a bat, and hot as a hare." This is caused by ingesting tropane alkaloids from plants like *Datura stramonium* or *Atropa belladonna*.

Step 2: Identify the therapeutic target. The toxicity is due to competitive antagonism at muscarinic acetylcholine receptors. To overcome this block in severe cases involving central manifestations like wild delirium, seizures, or coma, an acetylcholinesterase inhibitor must be utilized.

Step 3: Evaluate Physostigmine. Physostigmine is a tertiary amine structure. Because it is uncharged, it easily crosses the lipophilic blood-brain barrier. Once in the central nervous system, it inhibits acetylcholinesterase, leading to an increase in endogenous acetylcholine concentrations, which successfully outcompetes the tropane alkaloids at the central receptor sites.

Step 4: Differentiate from other choices. Neostigmine and pyridostigmine contain quaternary ammonium structures; they are permanently charged and cannot cross the blood-brain barrier, making them useless for central anticholinergic delirium. Atropine sulfate is a muscarinic antagonist and would worsen the condition. Pralidoxime is an acetylcholinesterase reactivator used specifically for organophosphate poisonings.

Step 5: Thus, Physostigmine is the specific antidote indicated for severe central nervous system anticholinergic toxicity.

Final Answer:

Answer: (C)

[Go Back to Question 7](#)



Q8.

Solution**Concept:**

The sequential progression of post-mortem changes—specifically algor mortis, livor mortis (hypostasis), and rigor mortis—provides forensic experts with a reliable timeline to estimate the time elapsed since death. The rate of these processes depends on predictable physical and chemical alterations within body tissues post-fixation.

Solution:

Step 1: Analyze the status of post-mortem lividity (hypostasis). The prompt states that hypostasis has become completely fixed and does not blanch upon digital pressure. Post-mortem lividity typically begins within 1 to 2 hours after death, becomes fully expressed, and fixes completely between 6 to 12 hours post-mortem, as red blood cells sediment permanently and hemolyze into the surrounding dermis.

Step 2: Analyze the status of rigor mortis. The prompt indicates that rigor mortis is well-established all over the body, including both large muscles and the small muscles of the fingers and toes. Under average tropical climates, rigor mortis takes approximately 12 hours to fully develop across the entire muscular system from head to toe.

Step 3: Synthesize the timeline based on environmental context. In tropical zones, the standard rule of thumb for rigor mortis is that it takes about 12 hours to fully establish, stays fully manifest for another 12 hours (totaling 12 to 24 hours), and then begins to recede in the same order it appeared due to secondary flaccidity from autolysis.

Step 4: Since hypostasis is completely fixed (indicating > 6–12 hours) and rigor mortis is fully established throughout the entire body but has not yet started to recede (indicating it is within the peak plateau phase), the most accurate timeline estimation lies between 12 and 24 hours.

Step 5: Eliminate shorter windows (2 to 8 hours) because rigor would not be fully established in the lower extremities and distal small digits, and lividity would still blanch. Windows past 36 hours can be eliminated because rigor would have entirely passed due to tissue decomposition.

Final Answer:

Answer: (C)

[Go Back to Question 8](#)



Q9.

Solution**Concept:**

Overdoses of certain psychiatric medications can result in severe cardiovascular toxicity and neurological instability. Understanding the cardiotoxic fingerprint on an electrocardiogram—specifically relating to sodium channel blockade—helps pinpoint the exact drug class involved in an acute overdose presentation.

Solution:

Step 1: Deconstruct the clinical presentation. The patient has ingested a massive overdose of an antidepressant, resulting in a prolonged QTc interval, a severely widened QRS complex (> 120 ms), and generalized tonic-clonic seizures.

Step 2: Identify the pathophysiological mechanism behind these specific ECG changes. Widening of the QRS complex in an antidepressant overdose is primarily driven by the potent inhibition of fast voltage-gated sodium channels ($Nav_{1.5}$) in the cardiac myocardium. This slows phase 0 of the cardiac action potential and delays intraventricular conduction. Prolongation of the QTc interval occurs due to blocking of the potassium efflux channels (I_{Kr}).

Step 3: Evaluate the antidepressant classes. Tricyclic Antidepressants (TCAs), of which Amitriptyline is a classic example, are notorious for this dangerous triad of toxicities: central nervous system depression/seizures, anticholinergic signs, and profound cardiotoxicity secondary to myocardial sodium channel blockade.

Step 4: Contrast with the other options provided. Fluoxetine is a Selective Serotonin Reuptake Inhibitor (SSRI) and carries a significantly wider therapeutic index; it rarely causes marked QRS widening or severe cardiotoxicity in isolation. Lithium overdose presents primarily with coarse tremors, ataxia, gastrointestinal distress, and neuromuscular irritability, but not acute, severe sodium-channel-mediated QRS widening. Diazepam is a benzodiazepine that causes generalized sedation and respiratory depression, but not conduction delays or cardiotoxicity.

Step 5: Conclude that Amitriptyline is the substance responsible for this classic cardiotoxic and neurotoxic profile.

Final Answer:

Answer: (A)

[Go Back to Question 9](#)



Q10.

Solution**Concept:**

The medicolegal evaluation of an alleged sexual assault victim requires strict adherence to legal statutes, medical ethics, and standard operational guidelines. Procedures must balance evidentiary collection with the human rights, dignity, and autonomy of the patient, avoiding outdated and unscientific practices.

Solution:

Step 1: Evaluate the absolute requirement for informed consent in medicolegal procedures. A medical examination of a sexual assault victim can never be legally or ethically performed without obtaining valid, informed written consent. If the victim is a competent adult, her individual consent is mandatory. If the victim is a minor or lacks capacity, consent must be obtained from a legally authorized guardian. A police request alone cannot override the requirement for personal or guardian consent.

Step 2: Examine option (B). The absence of structural physical injuries or lacerations to the hymen does not rule out sexual assault. The hymen can be naturally elastic, or the nature of the assault may not have caused mechanical tearing, meaning its integrity cannot be used to disprove an allegation of assault.

Step 3: Evaluate option (D) regarding the "two-finger test" (per vaginum examination to assess laxity). The Supreme Court of India and international medical guidelines have explicitly banned the two-finger test, declaring it unscientific, invasive, and a violation of a woman's right to privacy and dignity. It has zero diagnostic value in confirming or refuting sexual assault.

Step 4: Assess option (C). This statement aligns with forensic protocols and human rights frameworks: informed written consent must be obtained from the victim (or her legal guardian if she is a minor) prior to initiating any part of the examination or evidence collection.

Step 5: Thus, option (C) represents the correct and lawful guideline for conducting this medicolegal evaluation.

Final Answer:

Informed written consent must be obtained from the victim, or her legal guardian if she is a minor, prior to the examination.

Answer: (C)[Go Back to Question 10](#)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	D	2	D	3	B	4	B	5	A
6	A	7	C	8	C	9	A	10	C

