INI CET Forensic Medicine

Sample Paper – 2

Duration: 14 Minutes **Maximum Marks: 15**

Instructions

- This paper contains **15** Multiple Choice Questions (Single Best Response), modelled on the Forensic Medicine and Toxicology content of **INI CET** (Institutes of National Importance Combined Entrance Test) conducted by AIIMS New Delhi.
- The **15-question** length matches the number of Forensic Medicine items you actually meet in the real 200-question paper.
- Each correct answer carries **+1 mark**. There is **negative marking of one-third (0.33) mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- Attempt this practice paper in one timed sitting of about **14 minutes**, the pace the real computer-based test demands.

Thanatology

Q1. Rigor mortis, the post-mortem stiffening of muscle, is produced by:

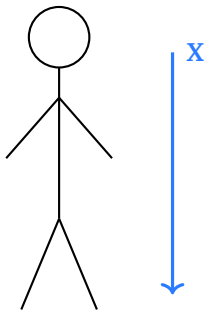
(A) Heat coagulation of muscle proteins

(B) Depletion of ATP, which locks the actin and myosin filaments together

(C) Bacterial gas formation within the muscle fibres

(D) Rapid rebuilding of ATP stores after death

Q2. The schematic marks the direction (**X**) in which rigor mortis spreads once it begins in the small muscles of the eyelids and jaw. Following Nysten's rule, this direction is:



(A) Foot to head (ascending)

(B) Left side to right side

(C) Head to foot (descending)

(D) Random, with no fixed order

Q3. Which statement about rigor mortis is correct?

(A) It is hastened in a cold environment and delayed in a hot climate

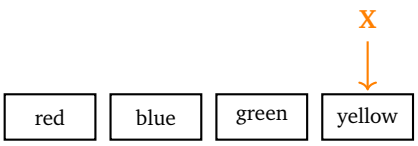
(B) A high body temperature and vigorous muscular activity just before death hasten its onset

(C) Cadaveric spasm appears only several hours after death, exactly like ordinary rigor

(D) Its onset is independent of the muscle ATP level present at the moment of death

Mechanical Injuries

Q4. The timeline shows the colour changes of a bruise as it ages. The colour at the stage marked **X** (a bruise roughly 7 to 12 days old) is:



(A) Yellow (a resolving bruise, about 7 to 12 days old)

(B) Red (a fresh bruise, within a few hours)

(C) Blue or purple (about 1 to 3 days old)

(D) Green (about 4 to 7 days old)

Q5. An ectopic (migratory) bruise is best described as one that:

(A) Never changes colour with the passage of time

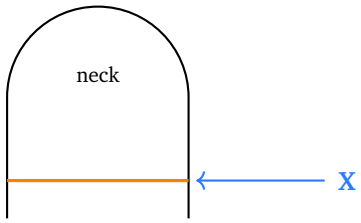
(B) Appears only at the exact site of the impact

(C) Appears at a site away from the point of impact, the extravasated blood having tracked along tissue planes under gravity

(D) Is always artificial and self-inflicted

Asphyxial Deaths

Q6. The neck schematic shows the mark (**X**) found in ligature strangulation. Compared with manual strangulation, this ligature mark is typically:



(A) Absent altogether

(B) A group of crescentic abrasions produced by fingernails

(C) Placed high in the neck above the thyroid and running obliquely upward, as in hanging

(D) A continuous, encircling, horizontal groove placed low in the neck

Q7. In manual strangulation (throttling), which finding on the neck is most characteristic?

(A) A single continuous ligature groove encircling the whole neck

(B) A patterned knot mark sitting over the nape of the neck

(C) An inverted-V, non-continuous mark above the level of the thyroid cartilage

(D) Discoid finger-tip bruises together with crescentic nail abrasions over the neck skin

Forensic Identification and Medical Jurisprudence

Q8. Union of the epiphysis at the lower (distal) end of the radius is generally complete by about the age of:

(A) 12 years

(B) 18 to 19 years

(C) 25 years

(D) 6 years

Q9. The medial (sternal) end of the clavicle, the last epiphysis in the body to fuse, generally unites by about the age of:

(A) 15 years

(B) 18 years

(C) 22 to 25 years

(D) 40 years

Q10. Which ossification centre, when present in a newborn, is used medico-legally to establish that the infant was full-term (mature)?

(A) Lower (distal) end of the femur

(B) Upper (proximal) end of the humerus

(C) Head of the femur

(D) Lower (distal) end of the radius

General Toxicology and Corrosive Poisons

Q11. Which corrosive acid characteristically produces a yellow staining of the skin (the xanthoproteic reaction) on contact?

(A) Sulphuric acid

(B) Hydrochloric acid

(C) Nitric acid

(D) Carbolic acid

Q12. Ingestion of a strong corrosive acid most characteristically injures the gastrointestinal wall by producing:

(A) Coagulative necrosis with a hard, dry eschar

(B) Liquefactive necrosis with deep, penetrating softening

(C) Caseous necrosis of the mucosa

(D) No mucosal injury at all

Specific Poisons

Q13. Under the usual Indian legal provision, a driver is presumed to be under the influence of alcohol when the blood alcohol concentration exceeds:

(A) 30 mg per 100 mL of blood

(B) 300 mg per 100 mL of blood

(C) 5 mg per 100 mL of blood

(D) 150 mg per 100 mL of blood

Q14. Methanol (methyl alcohol) poisoning characteristically produces which combination of features?

(A) Cherry-red skin with no acidosis

(B) Optic nerve damage (visual loss or blindness) together with a high anion gap metabolic acidosis

(C) Immediate hepatic failure with no visual effects

(D) Sensorineural hearing loss with respiratory alkalosis

Q15. The specific antidote used in methanol poisoning, which acts by inhibiting the enzyme alcohol dehydrogenase, is:

(A) Atropine with pralidoxime

(B) Naloxone

(C) N-acetylcysteine

(D) Ethanol or fomepizole

Detailed Solutions

Q1.

Solution

Concept – basis of rigor mortis: Living muscle needs ATP both to contract and to relax.

Step 1 – what happens after death: Once respiration stops, no fresh ATP is made and the existing stores are used up.

Step 2 – the stiffening: Without ATP the actin and myosin filaments cannot dissociate, so they stay locked together and the muscle becomes rigid.

Why the other options are wrong:

- A, heat coagulation: that is heat stiffening (a separate change), not ordinary rigor.
- C, gas formation: that is putrefactive bloating, a later change.
- D, rebuilding ATP: ATP falls after death, it is not rebuilt.

Final Answer: Depletion of ATP $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q1

Q2.

Solution

Concept – Nysten's rule: Rigor mortis appears and then passes off in a fixed order.

Step 1 – where it starts: It first involves the small muscles of the eyelids, jaw and face.

Step 2 – the direction X: From there it extends downward, in a **head-to-foot (descending)** direction, and passes off in the same order.

Why the other options are wrong:

- A, foot to head: this reverses the true direction.
- B, left to right: rigor does not follow a side-to-side order.
- D, random: the sequence is orderly, not random.

Final Answer: Head to foot (descending) $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q2

Q3.

Solution

Concept – factors that modify rigor: Anything that lowers ATP faster hastens rigor.

Step 1 – effect of temperature and activity: A high body temperature and vigorous muscular exertion just before death both burn ATP quickly, so rigor sets in sooner.

Step 2 – contrast with cadaveric spasm: Cadaveric spasm is instantaneous, gripping a group of muscles at the moment of death, and is not preceded by primary flaccidity.

Why the other options are wrong:

- A: cold delays rigor and heat hastens it, so the statement is reversed.
- C: cadaveric spasm is immediate, not delayed by several hours.
- D: onset depends directly on the ATP left in the muscle at death.

Final Answer: High temperature and pre-death exertion hasten rigor $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q3

Q4.

Solution

Concept – ageing a bruise by colour: A bruise changes colour as the extravasated haemoglobin is broken down.

Step 1 – the colour sequence: Red (fresh) $\rightarrow$ blue or purple (1 to 3 days) $\rightarrow$ green (4 to 7 days) $\rightarrow$ yellow (7 to 12 days) $\rightarrow$ fading.

Step 2 – read the stage X: X marks the last stage, about 7 to 12 days, which is **yellow** (from bilirubin and haematoidin).

Why the other options are wrong:

- B, red: a fresh bruise, only hours old.
- C, blue or purple: about 1 to 3 days old.
- D, green: about 4 to 7 days old.

Final Answer: Yellow (7 to 12 days) $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q4

Q5.

Solution

Concept – ectopic bruise: Blood can travel from the point of impact before it surfaces.

Step 1 – the mechanism: Extravasated blood tracks along fascial and tissue planes, moving under gravity.

Step 2 – the appearance: The bruise therefore shows up at a site **away** from where the blow landed (for example, a blow on the forehead surfacing as a black eye).

Why the other options are wrong:

- A: an ectopic bruise still passes through the usual colour changes.
- B: appearing only at the impact site describes an ordinary, not ectopic, bruise.
- D: it is a genuine gravitational bruise, not necessarily artificial.

Final Answer: Appears away from the point of impact $\Rightarrow$ C

Answer: (C) Go Back to Q5

Q6.

Solution

Concept – ligature versus manual strangulation: The neck mark tells the two apart.

Step 1 – identify X: In ligature strangulation the pull is horizontal, so the mark X is a **continuous, encircling, horizontal groove placed low** in the neck, below the thyroid.

Step 2 – contrast: This differs from hanging (oblique, high, non-continuous) and from manual strangulation (no ligature mark, only nail and finger marks).

Why the other options are wrong:

- A: a ligature does leave a definite mark.
- B: crescentic nail abrasions are seen in manual strangulation, not ligature.
- C: a high, oblique, upward mark describes hanging.

Final Answer: Continuous horizontal low groove $\Rightarrow$ D

Answer: (D) Go Back to Q6

Q7.

Solution

Concept – signs of throttling: Manual strangulation is done with the hand, so the marks are made by fingers and nails.

Step 1 – name the finding: The neck shows **discoid finger-tip bruises** and **crescentic nail abrasions**, often with fracture of the hyoid or thyroid cartilage.

Step 2 – why: The gripping fingers press the pads and dig the nails into the skin.

Why the other options are wrong:

- A: a continuous encircling groove is a ligature (not manual) sign.
- B: a knot mark belongs to a ligature.
- C: an inverted-V, non-continuous mark is a hanging sign.

Final Answer: Discoid bruises with crescentic nail abrasions $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q7

Q8.

Solution

Concept – age from bone union: Each epiphysis fuses at a fairly fixed age, allowing age estimation.

Step 1 – the distal radius: The epiphysis at the lower end of the radius unites at about **18 to 19 years**.

Step 2 – use: Confirming this union helps establish that a person is close to or over 18.

Why the other options are wrong:

- A, 12 years: too early for distal radius union.
- C, 25 years: that is nearer the last-fusing clavicle.
- D, 6 years: far too young.

Final Answer: 18 to 19 years $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q8

Q9.

Solution

Concept – the last epiphysis to fuse: The medial end of the clavicle unites latest of all.

Step 1 – the age: The sternal (medial) end of the clavicle fuses at about **22 to 25 years**.

Step 2 – significance: Its non-union suggests age under about 25, and it is a useful upper-age marker.

Why the other options are wrong:

- A, 15 years, and B, 18 years: too early for this epiphysis.
- D, 40 years: no epiphysis fusion occurs this late.

Final Answer: 22 to 25 years $\Rightarrow$ C

Answer: (C) Go Back to Q9

Q10.

Solution

Concept – proof of maturity in a newborn: One ossification centre appears only near full term.

Step 1 – name the centre: The centre at the **lower end of the femur** (the centre of Beclard) appears at about the ninth month.

Step 2 – medico-legal use: Its presence in a dead newborn indicates the infant was full-term (mature).

Why the other options are wrong:

- B, upper humerus, and D, lower radius: appear well after birth.
- C, head of femur: appears in infancy, not used as the term marker.

Final Answer: Lower end of the femur $\Rightarrow$ A

Answer: (A) Go Back to Q10

Q11.

Solution

Concept – identifying a corrosive acid: Each acid leaves a signature effect on tissue.

Step 1 – the yellow stain: Nitric acid reacts with skin proteins to give a yellow colour, the xanthoproteic reaction.

Step 2 – confirm: The stain later turns orange with alkali, a useful identifying clue.

Why the other options are wrong:

- A, sulphuric acid: produces black or brown charring, not a yellow stain.
- B, hydrochloric acid: gives greyish-brown burns.
- D, carbolic acid: is phenol, causing white or grey corrosion, not the xanthoproteic reaction.

Final Answer: Nitric acid $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept – how acids and alkalis differ in tissue: Acids and alkalis kill tissue in opposite ways.

Step 1 – action of a strong acid: A corrosive acid causes **coagulative necrosis**, precipitating proteins into a hard, dry eschar.

Step 2 – the effect: The firm eschar tends to limit deep penetration, unlike an alkali.

Why the other options are wrong:

- B, liquefactive necrosis: that is the deep, penetrating action of alkalis.
- C, caseous necrosis: a feature of tuberculosis, not corrosives.
- D, no injury: strong acids clearly damage the mucosa.

Final Answer: Coagulative necrosis with a hard eschar $\Rightarrow$ A

Answer: (A) Go Back to Q12

Q13.

Solution

Concept – the legal blood alcohol limit: A defined blood level marks legal intoxication for driving.

Step 1 – the value: Indian law sets the limit at **30 mg per 100 mL of blood** (30 mg%).

Step 2 – meaning: A driver above this level is presumed to be under the influence.

Why the other options are wrong:

- B, 300 mg%: a very high, near-stupor level, not the legal cut-off.
- C, 5 mg%: far below any meaningful limit.
- D, 150 mg%: represents marked intoxication, not the statutory limit.

Final Answer: 30 mg per 100 mL $\Rightarrow$ A

Answer: (A) Go Back to Q13

Q14.

Solution

Concept – methanol toxicity: Methanol itself is mild, but its metabolites are dangerous.

Step 1 – the metabolites: Methanol is oxidised to formaldehyde and then to formic acid.

Step 2 – the clinical picture: Formic acid damages the optic nerve, causing **visual loss or blindness**, and produces a **high anion gap metabolic acidosis**.

Why the other options are wrong:

- A, cherry-red skin with no acidosis: suggests cyanide or carbon monoxide.
- C, immediate hepatic failure with no visual effects: not the methanol pattern.
- D, hearing loss with respiratory alkalosis: describes salicylate features, not methanol.

Final Answer: Optic damage with high anion gap acidosis $\Rightarrow$ B

Answer: (B) Go Back to Q14

Q15.

Solution

Concept – antidote to methanol: Block the enzyme that makes the toxic metabolites.

Step 1 – the enzyme: Alcohol dehydrogenase converts methanol to its toxic products.

Step 2 – the antidote: Ethanol or fomepizole inhibits or competes for this enzyme, so methanol is excreted unchanged and formic acid is not formed.

Why the other options are wrong:

- A, atropine with pralidoxime: the antidote for organophosphate poisoning.
- B, naloxone: reverses opioids.
- C, N-acetylcysteine: the antidote for paracetamol.

Final Answer: Ethanol or fomepizole $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q15

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	C	3	B	4	A	5	C
6	D	7	D	8	B	9	C	10	A
11	C	12	A	13	A	14	B	15	D