

SET A

Forensic Science

1. Under the *Bharatiya Nagarik Suraksha Sanhita*, 2023, which Section mandates video-recording of search and seizure operations ?
(A) Section 50 (B) Section 62
(C) Section 105 (D) Section 176
2. When is it appropriate for the first responding officer to move a piece of evidence ?
(A) When the evidence is a gun
(B) When he is charged with the responsibility of processing the scene for physical evidence
(C) Only when the scene is secured
(D) If the crime is serious such as a homicide
3. **Assertion (A) :** Under the *Bharatiya Sakshya Adhinyam*, 2023, expert opinion is relevant and is conclusive proof.
Reason (R) : The court has authority to evaluate the credibility of an expert in conjunction with other evidence.
(A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

4. **Statement I** : In baseline method, an object or evidence is located relative to a perpendicular drop to a line.

Statement II : Triangulation method involves locating the object relative to two fixed immovable points at the scene.

- (A) Both Statements I and II are correct.
 - (B) Both Statements I and II are incorrect.
 - (C) Only Statement I is correct
 - (D) Only Statement II is correct.
5. Choose the incorrectly matched option :
- (A) IAFIS–Fingerprints
 - (B) CODIS–DNA
 - (C) NIBIN–Ballistics
 - (D) SICAR–Handwriting
6. **Assertion (A)** : The analysis of gun-shot residues through NAA offers a key advantage over analysis through SEM-EDS.
- Reason (R)** : NAA achieves higher elemental sensitivity without the need of particle morphology correlation.
- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
 - (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
 - (C) (A) is true, but (R) is false.
 - (D) (A) is false, but (R) is true.

7. During cross-examination, a forensic serologist admits that an ELISA result was positive but no confirmatory test was performed before reporting. The strongest criticism is that :

(A) ELISA is never admissible.

(B) Screening tests should ideally be corroborated with confirmatory analysis where required.

(C) ELISA cannot detect antibodies.

(D) Immunoassays are qualitative only.

8. **Assertion (A) :** NMR spectroscopy is not limited to the measurement of nuclei with magnetic moments.

Reason (R) : NMR spectra are characterized by chemical shift and spin–spin splitting of peaks.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

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9. Choose the *correct* option for detectors used in HPLC :

1. Thermal Conductivity detector
2. Electron Capture detector
3. Refractive Index detector
4. Mass spectrometer

Options :

- (A) 1, 2 and 3 only
- (B) 2, 3 and 4 only
- (C) 1 and 2 only
- (D) 3 and 4 only

10. **Statement I :** Quality assurance techniques are used to add confidence to the measurement process in forensic laboratories.

Statement II : The frequency of Quality assurance testing depends on the instrument and type of measurement being made.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

11. Dried semen stain is collected using :
- (A) Alcohol-soaked swab
 - (B) Deionized water-moistened swab
 - (C) Saline-soaked gauze
 - (D) Dry cotton swab
12. The analysis used to differentiate chromosomes based on size and banding pattern is known as :
- (A) Electrophoresis
 - (B) DNA sequencing
 - (C) Hybridization
 - (D) Karyotyping
13. **Statement I** : The sperm tail stains blue with Christmas Tree stain.
Statement II : Indigo carmine stains sperm tail yellowish-green.
- (A) Both Statements I and II are correct.
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14. John Herr is associated with the development of :
- (A) PCR primers
 - (B) DNA fingerprinting
 - (C) Sperm paints
 - (D) STR kits

15. Match the following :

Column I

- A. Repeat region
- B. Primer binding region
- C. Flanking region
- D. Allele dropout

Column II

- 1. Failure of amplification
- 2. Adjacent to STR
- 3. Primer annealing
- 4. Possible polymorphism site

Options :

- (A) A-1, B-2, C-3, D-4
- (B) A-2, B-3, C-1, D-4
- (C) A-4, B-2, C-3, D-1
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16. Arrange the following methods in chronological order of their development for Breath Alcohol testing :

- 1. Drunk-o-meter
- 2. Fuel Cell Technology
- 3. Breathalyzer
- 4. Alcotest 7110

Options :

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

17. **Assertion (A) :** The metabolism of alcohol differs significantly from that of other drugs in human body.

Reason (R) : In case of alcohol, the rate of metabolism is dependent of its concentration in bloodstream.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

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(C) (A) is true, but (R) is false.

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18. Choose the correctly matched option :

1. Dille-Koppanyi Test–Barbiturates
2. Duqueonois-Levine test–Marijuana
3. Scott test–Amphetamines

Options :

(A) 1, 2 and 3

(B) 2 and 3 only

(C) 1 and 2 only

(D) 2 only

19. Drugs used to facilitate sexual assault or 'date rape drugs' do not include :

- (A) Gamma-hydroxybutyrate
- (B) Flunitrazepam
- (C) Ketamine
- (D) Ephedrine

20. **Statement I** : Parathion is excreted as *p*-nitrophenol through urine.

Statement II : Malathion is excreted in urine as esterase.

- (A) Both Statements I and II are correct.
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21. Tool mark examination relies primarily on comparing :

- (A) Chemical composition of the tool
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- (C) Weight and size of the tool only
- (D) Manufacturer's serial number

22. Tear gas cartridges are the same as blank ammunition, except they contain a small quantity of sternutatory or lachrymatory substance. This substance may include :

1. Chloracetophenone
2. Phenyacylchloride
3. Nonivamide
4. Bromoacetone

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 1, 2 and 3 only
- (D) 1, 2, 3 and 4

23. Restoration of erased or obliterated markings on metal surfaces, for instance, engine or chassis numbers using chemical etching exploits differences in :

- (A) Surface color uniformity
- (B) Strain-hardening of metal beneath the stamped marks *versus* surrounding metal
- (C) Magnetic permeability only
- (D) Surface temperature variations

24. Assertion (A) : Comparative Bullet Lead Analysis (CBLA), once used to associate bullets via trace elemental composition, has been largely discredited and discontinued by the FBI.

Reason (R) : Compositionally indistinguishable lead originates from a single, limited manufacturing batch traceable to a specific box of ammunition was scientifically unsupported.

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25. Choose the incorrectly matched option :

(A) Paradox–Smooth bore firearm barrel with a short length of rifling at muzzle end.

(B) Drilling–Combination of one shotgun barrels and two rifle barrels.

(C) Zwilling–Combination of one shotgun barrel and one rifle barrel.

(D) None of the above

26. Match the following :

List I	List II
(Black Powder Granules)	(Their Use)
A. Fg	1. Pistol
B. FFg	2. Musket
C. FFFg	3. Priming
D. FFFFg	4. Rifle

Options :

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

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

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27. **Statement I :** 'A' type blasting powder is based on ammonium nitrate.

Statement II : 'B' type blasting powder is based on potassium nitrate.

(A) Both Statements I and II are correct.

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28. RCIED is an acronym used for :

- (A) Rapid Controlled Improvised Explosive Device
- (B) Radio Controlled Incendiary Explosive Device
- (C) Remote Current Ignition Electronic Device
- (D) Remote Controlled Improvised Explosive Device

29. Consider the following statements about fireworks powder and choose the correct options :

- 1. It has ten granulations.
- 2. It includes meal D.
- 3. It includes fine meal and extra-fine meal.

Options :

- (A) 1 only
- (B) 2 only
- (C) 1 and 3 only
- (D) 1, 2 and 3

30. Drysdale has described the smoldering process in a horizontal cellulose rod through three zones. The highest temperature during smoldering occurs in :

- (A) Zone 1
- (B) Zone 2
- (C) Zone 3
- (D) Outside the rod

31. Assertion (A) : Digital cameras use different types of shutters to control image exposures.

Reason (R) : Shutter determines the amount of light reaching the image sensor.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

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(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

32. Match the following operating systems with their owners :

List I

A. Blackberrys

B. Android

C. iOS

D. Windows

List II

1. Research in Motion

2. Open Handset Alliance

3. Microsoft

4. Apple

Options :

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

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

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

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

33. Forensic tool that can capture and analyze actual traffic (or packets) moving on the network :

- (A) Wireshark
- (B) Snort
- (C) NetWitness Investigator
- (D) All of these

34. **Statement I :** CDMA uses an electronic serial number to identify individual handsets.

Statement II : GSM uses international mobile equipment identity to identify handsets.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
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35. Arrange the following methods in chronological order of their development for RI measurements of Glass Evidence :

1. Double variation method
2. Becke line immersion method
3. Temperature variation method
4. Hot-Stage microscope method

Choose the correct option :

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

36. Arrange the following according to their order of volatility :

1. Register content
2. Routing table
3. Swap space
4. Data on hard disk
5. Remotely logged data

Options :

- (A) 1, 2, 3, 4, 5
- (B) 3, 1, 2, 4, 5
- (C) 3, 1, 2, 5, 4
- (D) 1, 3, 2, 4, 5

37. Assertion (A) : Periocular biometrics eliminate the need for facial and iris recognition.

Reason (R) : The periocular region provides a balance between information obtained from the whole face and the iris alone.

- (A) Both (A) and (R) are true.
- (B) (A) is false, but (R) is true.
- (C) (A) is true, but (R) is false.
- (D) Both (A) and (R) are false.

38. Which one of the following factors limits the scope for comparison of tire impressions ?

- (A) The manufacturer's specifications
- (B) The experience of the examiner
- (C) The amount of detail retained in the impression
- (D) The age of the tire

39. Which of the following are included in the triangle of interaction for fingerprint identification ?

- 1. Composition of fingerprint residue
- 2. Nature of deposition surface
- 3. Time elapsed before examination
- 4. Environmental conditions
- 5. Colour of the fingerprint residue

Choose the correct option :

- (A) 1, 2 and 3 only
- (B) 1, 2 and 5 only
- (C) 1, 3 and 4 only
- (D) 1, 2 and 4 only

40. Which one of the following pairs is incorrectly matched ?

- | | |
|-------------------------|----------------------|
| (A) Jet airplane–120 dB | (B) Typewriter–45 dB |
| (C) Conversation–35 dB | (D) Shouting–75 dB |

41. Assertion (A) : Nasal consonants are important in forensic speaker identification.

Reason (R) : The nasal cavity shows high intra-speaker variation of acoustic features.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is false, but (R) is true.

(D) (A) is true, but (R) is false.

42. Match the following :

List I

(Authors)

1. Donald Doud
2. David Ellen
3. James V.P. Conway
4. Ordway Hilton

List II

(Books)

- A. Evidential Documents
- B. Witness to Forgery
- C. Scientific Examination of Questioned Documents
- D. The Scientific Examination of Documents : Methods and Techniques

Options :

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

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

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

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

43. Foster and Freeman introduced the Electrostatic Detection Apparatus in the year :

- | | |
|----------|----------|
| (A) 1969 | (B) 1968 |
| (C) 1967 | (D) 1966 |

44. Distinctive and characteristic defects associated with ball point pen writing include :

1. Small dot like deposits of inks
2. Short gaps
3. Striations within the stroke
4. Shading

Options :

- (A) 1 and 4 only
(B) 2 and 3 only
(C) 1, 2 and 3 only
(D) 1, 2 and 4 only

45. **Statement I :** Fabric ribbon impressions are crisper than those of carbon ribbons.

Statement II : The amount of impact produced by typebar machines to create impressions is more than that in typeball machines.

- (A) Both Statements I and II are incorrect.
(B) Both Statements I and II are correct.
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46. Choose the age-related parameters included in Gustafson's method :

1. Crown Attrition
2. Primary Dentine
3. Periodontosis
4. Root Transparency
5. Root Resorption

Options :

- (A) 1, 3, 4 and 5 only
- (B) 1, 2 and 3 only
- (C) 1, 3 and 4 only
- (D) 1, 2, 3, 4 and 5

47. Which of the following statement(s) is/are *correct* ?

1. Hundreds of arthropod species may be collected from a corpse.
2. Many collected species are incidental and unrelated to carrion.
3. Every arthropod species collected is useful for PMI estimation.

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 2 and 3 only
- (D) 1, 2 and 3

48. The Crippen case of 1910 was the best-known instance of identification from :

- (A) Tattoo
- (B) Bite Mark
- (C) Scar
- (D) Hair Evidence

49. Statement I : In fresh water drowning, death occurs due to cerebral anoxia.

Statement II : In salt water drowning, death occurs due to myocardial anoxia.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
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50. “Putrefaction occurs fastest in air and slowest in earth.” This statement is supported by :

- (A) Casper’s dictum
- (B) Puppe’s rule
- (C) Cadaveric spasm
- (D) Raygat’s test

SET B

Forensic Science

1. Dried semen stain is collected using :
 - (A) Alcohol-soaked swab
 - (B) Deionized water-moistened swab
 - (C) Saline-soaked gauze
 - (D) Dry cotton swab
2. The analysis used to differentiate chromosomes based on size and banding pattern is known as :
 - (A) Electrophoresis
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- 1. Failure of amplification
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Options :

- (A) A-1, B-2, C-3, D-4
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6. Arrange the following methods in chronological order of their development for Breath Alcohol testing :

- 1. Drunk-o-meter
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Options :

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17. **Statement I :** 'A' type blasting powder is based on ammonium nitrate.

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B. Android

C. iOS

D. Windows

List II

1. Research in Motion

2. Open Handset Alliance

3. Microsoft

4. Apple

Options :

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2. David Ellen
3. James V.P. Conway
4. Ordway Hilton

List II

(Books)

- A. Evidential Documents
- B. Witness to Forgery
- C. Scientific Examination of
Questioned Documents
- D. The Scientific Examination of
Documents : Methods and
Techniques

Options :

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

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

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

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

33. Foster and Freeman introduced the Electrostatic Detection Apparatus in the year :

- | | |
|----------|----------|
| (A) 1969 | (B) 1968 |
| (C) 1967 | (D) 1966 |

34. Distinctive and characteristic defects associated with ball point pen writing include :

1. Small dot like deposits of inks
2. Short gaps
3. Striations within the stroke
4. Shading

Options :

- (A) 1 and 4 only
(B) 2 and 3 only
(C) 1, 2 and 3 only
(D) 1, 2 and 4 only

35. **Statement I :** Fabric ribbon impressions are crisper than those of carbon ribbons.

Statement II : The amount of impact produced by typebar machines to create impressions is more than that in typeball machines.

- (A) Both Statements I and II are incorrect.
(B) Both Statements I and II are correct.
(C) Only Statement I is correct
(D) Only Statement II is correct.

36. Choose the age-related parameters included in Gustafson's method :

1. Crown Attrition
2. Primary Dentine
3. Periodontosis
4. Root Transparency
5. Root Resorption

Options :

- (A) 1, 3, 4 and 5 only
- (B) 1, 2 and 3 only
- (C) 1, 3 and 4 only
- (D) 1, 2, 3, 4 and 5

37. Which of the following statement(s) is/are *correct* ?

1. Hundreds of arthropod species may be collected from a corpse.
2. Many collected species are incidental and unrelated to carrion.
3. Every arthropod species collected is useful for PMI estimation.

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 2 and 3 only
- (D) 1, 2 and 3

38. The Crippen case of 1910 was the best-known instance of identification from :

- (A) Tattoo
- (B) Bite Mark
- (C) Scar
- (D) Hair Evidence

39. Statement I : In fresh water drowning, death occurs due to cerebral anoxia.

Statement II : In salt water drowning, death occurs due to myocardial anoxia.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
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40. “Putrefaction occurs fastest in air and slowest in earth.” This statement is supported by :

- (A) Casper’s dictum
- (B) Puppe’s rule
- (C) Cadaveric spasm
- (D) Raygat’s test

41. Under the *Bharatiya Nagarik Suraksha Sanhita*, 2023, which Section mandates video-recording of search and seizure operations ?

- (A) Section 50 (B) Section 62
(C) Section 105 (D) Section 176

42. When is it appropriate for the first responding officer to move a piece of evidence ?

- (A) When the evidence is a gun
(B) When he is charged with the responsibility of processing the scene for physical evidence
(C) Only when the scene is secured
(D) If the crime is serious such as a homicide

43. **Assertion (A) :** Under the *Bharatiya Sakshya Adhinyam*, 2023, expert opinion is relevant and is conclusive proof.

Reason (R) : The court has authority to evaluate the credibility of an expert in conjunction with other evidence.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

44. Statement I : In baseline method, an object or evidence is located relative to a perpendicular drop to a line.

Statement II : Triangulation method involves locating the object relative to two fixed immovable points at the scene.

- (A) Both Statements I and II are correct.
- (B) Both Statements I and II are incorrect.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

45. Choose the incorrectly matched option :

- (A) IAFIS–Fingerprints
- (B) CODIS–DNA
- (C) NIBIN–Ballistics
- (D) SICAR–Handwriting

46. Assertion (A) : The analysis of gun-shot residues through NAA offers a key advantage over analysis through SEM-EDS.

Reason (R) : NAA achieves higher elemental sensitivity without the need of particle morphology correlation.

- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
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47. During cross-examination, a forensic serologist admits that an ELISA result was positive but no confirmatory test was performed before reporting. The strongest criticism is that :

- (A) ELISA is never admissible.
- (B) Screening tests should ideally be corroborated with confirmatory analysis where required.
- (C) ELISA cannot detect antibodies.
- (D) Immunoassays are qualitative only.

48. **Assertion (A) :** NMR spectroscopy is not limited to the measurement of nuclei with magnetic moments.

Reason (R) : NMR spectra are characterized by chemical shift and spin–spin splitting of peaks.

- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
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- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

49. Choose the *correct* option for detectors used in HPLC :

1. Thermal Conductivity detector
2. Electron Capture detector
3. Refractive Index detector
4. Mass spectrometer

Options :

- (A) 1, 2 and 3 only
- (B) 2, 3 and 4 only
- (C) 1 and 2 only
- (D) 3 and 4 only

50. **Statement I :** Quality assurance techniques are used to add confidence to the measurement process in forensic laboratories.

Statement II : The frequency of Quality assurance testing depends on the instrument and type of measurement being made.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

SET D

Forensic Science

1. Match the following :

List I	List II
(Black Powder Granules)	(Their Use)
A. Fg	1. Pistol
B. FFg	2. Musket
C. FFFg	3. Priming
D. FFFFg	4. Rifle

Options :

- (A) A-1, B-2, C-3, D-4
- (B) A-2, B-1, C-3, D-4
- (C) A-2, B-1, C-4, D-3
- (D) A-1, B-2, C-4, D-3
2. **Statement I :** 'A' type blasting powder is based on ammonium nitrate.
- Statement II :** 'B' type blasting powder is based on potassium nitrate.
- (A) Both Statements I and II are correct.
- (B) Both Statements I and II are incorrect.
- (C) Only Statement I is correct
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3. RCIED is an acronym used for :
- (A) Rapid Controlled Improvised Explosive Device
 - (B) Radio Controlled Incendiary Explosive Device
 - (C) Remote Current Ignition Electronic Device
 - (D) Remote Controlled Improvised Explosive Device
4. Consider the following statements about fireworks powder and choose the correct options :
- 1. It has ten granulations.
 - 2. It includes meal D.
 - 3. It includes fine meal and extra-fine meal.

Options :

- (A) 1 only
 - (B) 2 only
 - (C) 1 and 3 only
 - (D) 1, 2 and 3
5. Drysdale has described the smoldering process in a horizontal cellulose rod through three zones. The highest temperature during smoldering occurs in :
- (A) Zone 1
 - (B) Zone 2
 - (C) Zone 3
 - (D) Outside the rod

6. **Assertion (A) :** Digital cameras use different types of shutters to control image exposures.

Reason (R) : Shutter determines the amount of light reaching the image sensor.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

7. Match the following operating systems with their owners :

List I

A. Blackberrys

B. Android

C. iOS

D. Windows

List II

1. Research in Motion

2. Open Handset Alliance

3. Microsoft

4. Apple

Options :

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

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

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

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

8. Forensic tool that can capture and analyze actual traffic (or packets) moving on the network :

- (A) Wireshark
- (B) Snort
- (C) NetWitness Investigator
- (D) All of these

9. **Statement I :** CDMA uses an electronic serial number to identify individual handsets.

Statement II : GSM uses international mobile equipment identity to identify handsets.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
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- (D) Only Statement II is correct.

10. Arrange the following methods in chronological order of their development for RI measurements of Glass Evidence :

- 1. Double variation method
- 2. Becke line immersion method
- 3. Temperature variation method
- 4. Hot-Stage microscope method

Choose the correct option :

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

11. Arrange the following according to their order of volatility :

1. Register content
2. Routing table
3. Swap space
4. Data on hard disk
5. Remotely logged data

Options :

- (A) 1, 2, 3, 4, 5
- (B) 3, 1, 2, 4, 5
- (C) 3, 1, 2, 5, 4
- (D) 1, 3, 2, 4, 5

12. Assertion (A) : Periocular biometrics eliminate the need for facial and iris recognition.

Reason (R) : The periocular region provides a balance between information obtained from the whole face and the iris alone.

- (A) Both (A) and (R) are true.
- (B) (A) is false, but (R) is true.
- (C) (A) is true, but (R) is false.
- (D) Both (A) and (R) are false.

13. Which one of the following factors limits the scope for comparison of tire impressions ?

- (A) The manufacturer's specifications
- (B) The experience of the examiner
- (C) The amount of detail retained in the impression
- (D) The age of the tire

14. Which of the following are included in the triangle of interaction for fingerprint identification ?

- 1. Composition of fingerprint residue
- 2. Nature of deposition surface
- 3. Time elapsed before examination
- 4. Environmental conditions
- 5. Colour of the fingerprint residue

Choose the correct option :

- (A) 1, 2 and 3 only
- (B) 1, 2 and 5 only
- (C) 1, 3 and 4 only
- (D) 1, 2 and 4 only

15. Which one of the following pairs is incorrectly matched ?

- | | |
|-------------------------|----------------------|
| (A) Jet airplane–120 dB | (B) Typewriter–45 dB |
| (C) Conversation–35 dB | (D) Shouting–75 dB |

16. **Assertion (A) :** Nasal consonants are important in forensic speaker identification.

Reason (R) : The nasal cavity shows high intra-speaker variation of acoustic features.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is false, but (R) is true.

(D) (A) is true, but (R) is false.

17. Match the following :

List I

(Authors)

1. Donald Doud
2. David Ellen
3. James V.P. Conway
4. Ordway Hilton

List II

(Books)

- A. Evidential Documents
- B. Witness to Forgery
- C. Scientific Examination of Questioned Documents
- D. The Scientific Examination of Documents : Methods and Techniques

Options :

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

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

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

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

18. Foster and Freeman introduced the Electrostatic Detection Apparatus in the year :

- | | |
|----------|----------|
| (A) 1969 | (B) 1968 |
| (C) 1967 | (D) 1966 |

19. Distinctive and characteristic defects associated with ball point pen writing include :

1. Small dot like deposits of inks
2. Short gaps
3. Striations within the stroke
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Options :

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20. Statement I : Fabric ribbon impressions are crisper than those of carbon ribbons.

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21. Choose the age-related parameters included in Gustafson's method :

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22. Which of the following statement(s) is/are *correct* ?

1. Hundreds of arthropod species may be collected from a corpse.
2. Many collected species are incidental and unrelated to carrion.
3. Every arthropod species collected is useful for PMI estimation.

Options :

- (A) 1 only
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23. The Crippen case of 1910 was the best-known instance of identification from :

- (A) Tattoo
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24. Statement I : In fresh water drowning, death occurs due to cerebral anoxia.

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26. Under the *Bharatiya Nagarik Suraksha Sanhita*, 2023, which Section mandates video-recording of search and seizure operations ?

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27. When is it appropriate for the first responding officer to move a piece of evidence ?

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- (B) CODIS–DNA
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- (D) SICAR–Handwriting

31. Assertion (A) : The analysis of gun-shot residues through NAA offers a key advantage over analysis through SEM-EDS.

Reason (R) : NAA achieves higher elemental sensitivity without the need of particle morphology correlation.

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33. **Assertion (A) :** NMR spectroscopy is not limited to the measurement of nuclei with magnetic moments.

Reason (R) : NMR spectra are characterized by chemical shift and spin–spin splitting of peaks.

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- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

34. Choose the *correct* option for detectors used in HPLC :

1. Thermal Conductivity detector
2. Electron Capture detector
3. Refractive Index detector
4. Mass spectrometer

Options :

- (A) 1, 2 and 3 only
- (B) 2, 3 and 4 only
- (C) 1 and 2 only
- (D) 3 and 4 only

35. Statement I : Quality assurance techniques are used to add confidence to the measurement process in forensic laboratories.

Statement II : The frequency of Quality assurance testing depends on the instrument and type of measurement being made.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

36. Dried semen stain is collected using :
- (A) Alcohol-soaked swab
 - (B) Deionized water-moistened swab
 - (C) Saline-soaked gauze
 - (D) Dry cotton swab
37. The analysis used to differentiate chromosomes based on size and banding pattern is known as :
- (A) Electrophoresis
 - (B) DNA sequencing
 - (C) Hybridization
 - (D) Karyotyping
38. **Statement I** : The sperm tail stains blue with Christmas Tree stain.
Statement II : Indigo carmine stains sperm tail yellowish-green.
- (A) Both Statements I and II are correct.
 - (B) Both Statements I and II are incorrect.
 - (C) Only Statement I is correct
 - (D) Only Statement II is correct.
39. John Herr is associated with the development of :
- (A) PCR primers
 - (B) DNA fingerprinting
 - (C) Sperm paints
 - (D) STR kits

40. Match the following :

Column I

- A. Repeat region
- B. Primer binding region
- C. Flanking region
- D. Allele dropout

Column II

- 1. Failure of amplification
- 2. Adjacent to STR
- 3. Primer annealing
- 4. Possible polymorphism site

Options :

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

41. Arrange the following methods in chronological order of their development for Breath Alcohol testing :

- 1. Drunk-o-meter
- 2. Fuel Cell Technology
- 3. Breathalyzer
- 4. Alcotest 7110

Options :

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

42. Assertion (A) : The metabolism of alcohol differs significantly from that of other drugs in human body.

Reason (R) : In case of alcohol, the rate of metabolism is dependent of its concentration in bloodstream.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

43. Choose the correctly matched option :

1. Dille-Koppanyi Test–Barbiturates
2. Duqueonois-Levine test–Marijuana
3. Scott test–Amphetamines

Options :

(A) 1, 2 and 3

(B) 2 and 3 only

(C) 1 and 2 only

(D) 2 only

44. Drugs used to facilitate sexual assault or 'date rape drugs' do not include :

- (A) Gamma-hydroxybutyrate
- (B) Flunitrazepam
- (C) Ketamine
- (D) Ephedrine

45. Statement I : Parathion is excreted as *p*-nitrophenol through urine.

Statement II : Malathion is excreted in urine as esterase.

- (A) Both Statements I and II are correct.
- (B) Both Statements I and II are incorrect.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

46. Tool mark examination relies primarily on comparing :

- (A) Chemical composition of the tool
- (B) Class and individual characteristics impressed on a surface
- (C) Weight and size of the tool only
- (D) Manufacturer's serial number

47. Tear gas cartridges are the same as blank ammunition, except they contain a small quantity of sternutatory or lachrymatory substance. This substance may include :

1. Chloracetophenone
2. Phenyacylchloride
3. Nonivamide
4. Bromoacetone

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 1, 2 and 3 only
- (D) 1, 2, 3 and 4

48. Restoration of erased or obliterated markings on metal surfaces, for instance, engine or chassis numbers using chemical etching exploits differences in :

- (A) Surface color uniformity
- (B) Strain-hardening of metal beneath the stamped marks *versus* surrounding metal
- (C) Magnetic permeability only
- (D) Surface temperature variations

49. Assertion (A) : Comparative Bullet Lead Analysis (CBLA), once used to associate bullets via trace elemental composition, has been largely discredited and discontinued by the FBI.

Reason (R) : Compositionally indistinguishable lead originates from a single, limited manufacturing batch traceable to a specific box of ammunition was scientifically unsupported.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

50. Choose the incorrectly matched option :

(A) Paradox–Smooth bore firearm barrel with a short length of rifling at muzzle end.

(B) Drilling–Combination of one shotgun barrels and two rifle barrels.

(C) Zwilling–Combination of one shotgun barrel and one rifle barrel.

(D) None of the above

SET C

Forensic Science

1. Match the following :

List I	List II
(Black Powder Granules)	(Their Use)
A. Fg	1. Pistol
B. FFg	2. Musket
C. FFFg	3. Priming
D. FFFFg	4. Rifle

Options :

- (A) A-1, B-2, C-3, D-4
- (B) A-2, B-1, C-3, D-4
- (C) A-2, B-1, C-4, D-3
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2. **Statement I :** 'A' type blasting powder is based on ammonium nitrate.
- Statement II :** 'B' type blasting powder is based on potassium nitrate.
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4. Consider the following statements about fireworks powder and choose the correct options :

- 1. It has ten granulations.
- 2. It includes meal D.
- 3. It includes fine meal and extra-fine meal.

Options :

- (A) 1 only
- (B) 2 only
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Reason (R) : Shutter determines the amount of light reaching the image sensor.

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7. Match the following operating systems with their owners :

List I

A. Blackberrys

B. Android

C. iOS

D. Windows

List II

1. Research in Motion

2. Open Handset Alliance

3. Microsoft

4. Apple

Options :

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

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

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

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

8. Forensic tool that can capture and analyze actual traffic (or packets) moving on the network :

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10. Arrange the following methods in chronological order of their development for RI measurements of Glass Evidence :

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Choose the correct option :

- (A) 2, 3, 1, 4
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11. Arrange the following according to their order of volatility :

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Reason (R) : The periocular region provides a balance between information obtained from the whole face and the iris alone.

- (A) Both (A) and (R) are true.
- (B) (A) is false, but (R) is true.
- (C) (A) is true, but (R) is false.
- (D) Both (A) and (R) are false.

13. Which one of the following factors limits the scope for comparison of tire impressions ?

- (A) The manufacturer's specifications
- (B) The experience of the examiner
- (C) The amount of detail retained in the impression
- (D) The age of the tire

14. Which of the following are included in the triangle of interaction for fingerprint identification ?

- 1. Composition of fingerprint residue
- 2. Nature of deposition surface
- 3. Time elapsed before examination
- 4. Environmental conditions
- 5. Colour of the fingerprint residue

Choose the correct option :

- (A) 1, 2 and 3 only
- (B) 1, 2 and 5 only
- (C) 1, 3 and 4 only
- (D) 1, 2 and 4 only

15. Which one of the following pairs is incorrectly matched ?

- | | |
|-------------------------|----------------------|
| (A) Jet airplane–120 dB | (B) Typewriter–45 dB |
| (C) Conversation–35 dB | (D) Shouting–75 dB |

16. Assertion (A) : Nasal consonants are important in forensic speaker identification.

Reason (R) : The nasal cavity shows high intra-speaker variation of acoustic features.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is false, but (R) is true.

(D) (A) is true, but (R) is false.

17. Match the following :

List I

(Authors)

1. Donald Doud
2. David Ellen
3. James V.P. Conway
4. Ordway Hilton

List II

(Books)

- A. Evidential Documents
- B. Witness to Forgery
- C. Scientific Examination of
Questioned Documents
- D. The Scientific Examination of
Documents : Methods and
Techniques

Options :

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

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

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

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

18. Foster and Freeman introduced the Electrostatic Detection Apparatus in the year :

- | | |
|----------|----------|
| (A) 1969 | (B) 1968 |
| (C) 1967 | (D) 1966 |

19. Distinctive and characteristic defects associated with ball point pen writing include :

1. Small dot like deposits of inks
2. Short gaps
3. Striations within the stroke
4. Shading

Options :

- (A) 1 and 4 only
(B) 2 and 3 only
(C) 1, 2 and 3 only
(D) 1, 2 and 4 only

20. Statement I : Fabric ribbon impressions are crisper than those of carbon ribbons.

Statement II : The amount of impact produced by typebar machines to create impressions is more than that in typeball machines.

- (A) Both Statements I and II are incorrect.
(B) Both Statements I and II are correct.
(C) Only Statement I is correct
(D) Only Statement II is correct.

21. Choose the age-related parameters included in Gustafson's method :

1. Crown Attrition
2. Primary Dentine
3. Periodontosis
4. Root Transparency
5. Root Resorption

Options :

- (A) 1, 3, 4 and 5 only
- (B) 1, 2 and 3 only
- (C) 1, 3 and 4 only
- (D) 1, 2, 3, 4 and 5

22. Which of the following statement(s) is/are *correct* ?

1. Hundreds of arthropod species may be collected from a corpse.
2. Many collected species are incidental and unrelated to carrion.
3. Every arthropod species collected is useful for PMI estimation.

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 2 and 3 only
- (D) 1, 2 and 3

23. The Crippen case of 1910 was the best-known instance of identification from :

- (A) Tattoo
- (B) Bite Mark
- (C) Scar
- (D) Hair Evidence

24. Statement I : In fresh water drowning, death occurs due to cerebral anoxia.

Statement II : In salt water drowning, death occurs due to myocardial anoxia.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

25. “Putrefaction occurs fastest in air and slowest in earth.” This statement is supported by :

- (A) Casper’s dictum
- (B) Puppe’s rule
- (C) Cadaveric spasm
- (D) Raygat’s test

26. Under the *Bharatiya Nagarik Suraksha Sanhita*, 2023, which Section mandates video-recording of search and seizure operations ?

- (A) Section 50 (B) Section 62
(C) Section 105 (D) Section 176

27. When is it appropriate for the first responding officer to move a piece of evidence ?

- (A) When the evidence is a gun
(B) When he is charged with the responsibility of processing the scene for physical evidence
(C) Only when the scene is secured
(D) If the crime is serious such as a homicide

28. **Assertion (A) :** Under the *Bharatiya Sakshya Adhiniyam*, 2023, expert opinion is relevant and is conclusive proof.

Reason (R) : The court has authority to evaluate the credibility of an expert in conjunction with other evidence.

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

29. Statement I : In baseline method, an object or evidence is located relative to a perpendicular drop to a line.

Statement II : Triangulation method involves locating the object relative to two fixed immovable points at the scene.

- (A) Both Statements I and II are correct.
- (B) Both Statements I and II are incorrect.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

30. Choose the incorrectly matched option :

- (A) IAFIS–Fingerprints
- (B) CODIS–DNA
- (C) NIBIN–Ballistics
- (D) SICAR–Handwriting

31. Assertion (A) : The analysis of gun-shot residues through NAA offers a key advantage over analysis through SEM-EDS.

Reason (R) : NAA achieves higher elemental sensitivity without the need of particle morphology correlation.

- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

32. During cross-examination, a forensic serologist admits that an ELISA result was positive but no confirmatory test was performed before reporting. The strongest criticism is that :

- (A) ELISA is never admissible.
- (B) Screening tests should ideally be corroborated with confirmatory analysis where required.
- (C) ELISA cannot detect antibodies.
- (D) Immunoassays are qualitative only.

33. **Assertion (A) :** NMR spectroscopy is not limited to the measurement of nuclei with magnetic moments.

Reason (R) : NMR spectra are characterized by chemical shift and spin–spin splitting of peaks.

- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

34. Choose the *correct* option for detectors used in HPLC :

1. Thermal Conductivity detector
2. Electron Capture detector
3. Refractive Index detector
4. Mass spectrometer

Options :

- (A) 1, 2 and 3 only
- (B) 2, 3 and 4 only
- (C) 1 and 2 only
- (D) 3 and 4 only

35. Statement I : Quality assurance techniques are used to add confidence to the measurement process in forensic laboratories.

Statement II : The frequency of Quality assurance testing depends on the instrument and type of measurement being made.

- (A) Both Statements I and II are incorrect.
- (B) Both Statements I and II are correct.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

36. Dried semen stain is collected using :
- (A) Alcohol-soaked swab
 - (B) Deionized water-moistened swab
 - (C) Saline-soaked gauze
 - (D) Dry cotton swab
37. The analysis used to differentiate chromosomes based on size and banding pattern is known as :
- (A) Electrophoresis
 - (B) DNA sequencing
 - (C) Hybridization
 - (D) Karyotyping
38. **Statement I :** The sperm tail stains blue with Christmas Tree stain.
Statement II : Indigo carmine stains sperm tail yellowish-green.
- (A) Both Statements I and II are correct.
 - (B) Both Statements I and II are incorrect.
 - (C) Only Statement I is correct
 - (D) Only Statement II is correct.
39. John Herr is associated with the development of :
- (A) PCR primers
 - (B) DNA fingerprinting
 - (C) Sperm paints
 - (D) STR kits

40. Match the following :

Column I

- A. Repeat region
- B. Primer binding region
- C. Flanking region
- D. Allele dropout

Column II

- 1. Failure of amplification
- 2. Adjacent to STR
- 3. Primer annealing
- 4. Possible polymorphism site

Options :

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

41. Arrange the following methods in chronological order of their development for Breath Alcohol testing :

- 1. Drunk-o-meter
- 2. Fuel Cell Technology
- 3. Breathalyzer
- 4. Alcotest 7110

Options :

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

42. Assertion (A) : The metabolism of alcohol differs significantly from that of other drugs in human body.

Reason (R) : In case of alcohol, the rate of metabolism is dependent of its concentration in bloodstream.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

43. Choose the correctly matched option :

1. Dille-Koppanyi Test–Barbiturates
2. Duqueonois-Levine test–Marijuana
3. Scott test–Amphetamines

Options :

(A) 1, 2 and 3

(B) 2 and 3 only

(C) 1 and 2 only

(D) 2 only

44. Drugs used to facilitate sexual assault or 'date rape drugs' do not include :

- (A) Gamma-hydroxybutyrate
- (B) Flunitrazepam
- (C) Ketamine
- (D) Ephedrine

45. Statement I : Parathion is excreted as *p*-nitrophenol through urine.

Statement II : Malathion is excreted in urine as esterase.

- (A) Both Statements I and II are correct.
- (B) Both Statements I and II are incorrect.
- (C) Only Statement I is correct
- (D) Only Statement II is correct.

46. Tool mark examination relies primarily on comparing :

- (A) Chemical composition of the tool
- (B) Class and individual characteristics impressed on a surface
- (C) Weight and size of the tool only
- (D) Manufacturer's serial number

47. Tear gas cartridges are the same as blank ammunition, except they contain a small quantity of sternutatory or lachrymatory substance. This substance may include :

1. Chloracetophenone
2. Phenyacylchloride
3. Nonivamide
4. Bromoacetone

Options :

- (A) 1 only
- (B) 1 and 2 only
- (C) 1, 2 and 3 only
- (D) 1, 2, 3 and 4

48. Restoration of erased or obliterated markings on metal surfaces, for instance, engine or chassis numbers using chemical etching exploits differences in :

- (A) Surface color uniformity
- (B) Strain-hardening of metal beneath the stamped marks *versus* surrounding metal
- (C) Magnetic permeability only
- (D) Surface temperature variations

49. Assertion (A) : Comparative Bullet Lead Analysis (CBLA), once used to associate bullets via trace elemental composition, has been largely discredited and discontinued by the FBI.

Reason (R) : Compositionally indistinguishable lead originates from a single, limited manufacturing batch traceable to a specific box of ammunition was scientifically unsupported.

(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

50. Choose the incorrectly matched option :

(A) Paradox–Smooth bore firearm barrel with a short length of rifling at muzzle end.

(B) Drilling–Combination of one shotgun barrels and two rifle barrels.

(C) Zwilling–Combination of one shotgun barrel and one rifle barrel.

(D) None of the above