

Advanced Forensic Science Principles

Forensic Science · Practice Test · 20 Questions

1. Which analytical technique is primarily used to identify volatile organic compounds in fire debris analysis?

- A) High-performance liquid chromatography
- B) Gas chromatography-mass spectrometry
- C) Fourier-transform infrared spectroscopy
- D) Atomic absorption spectroscopy

2. In forensic anthropology, which feature is the most reliable indicator for determining biological sex from skeletal remains?

- A) The shape of the sternum
- B) The morphology of the pelvis
- C) The length of the humerus
- D) The dental arcade curvature

3. What is the chemical composition of the 'white residue' often found in presumptive tests for cocaine using cobalt thiocyanate?

- A) Cocaine hydrochloride
- B) Cocaine base
- C) Cocaine sulfate
- D) Cocaine nitrate

4. During DNA profiling, which specific genetic marker type is currently the gold standard for human identification in the CODIS system?

- A) Restriction Fragment Length Polymorphism
- B) Short Tandem Repeats
- C) Single Nucleotide Polymorphisms
- D) Variable Number Tandem Repeats

5. Which phase of hair growth is characterized by the cessation of cellular division and follicle shrinkage?

- A) Anagen
- B) Catagen
- C) Telogen
- D) Exogen

6. In bloodstain pattern analysis, what does an 'elliptical' bloodstain shape reveal about the impact angle?

- A) The height of the source
- B) The velocity of the impact
- C) The directionality and impact angle
- D) The blood volume

7. Which reagent is utilized to detect latent bloodstains by producing a chemiluminescent reaction upon contact with heme?

- A) Ninhydrin
- B) Silver nitrate
- C) Luminol
- D) Crystal violet

8. What is the primary function of the 'cortex' in a hair shaft during forensic microscopic analysis?

- A) Providing the pigment color and structural integrity
- B) Acting as the protective outer layer
- C) Containing the medullary canal
- D) Regulating keratin production

9. In forensic toxicology, which enzyme is most commonly involved in the phase I metabolism of xenobiotics?

- A) Cytochrome P450
- B) Alcohol dehydrogenase
- C) Glutathione S-transferase
- D) N-acetyltransferase

10. What is the critical temperature range for 'glass transition' in the study of forensic polymer analysis?

- A) The temperature where amorphous solids become brittle
- B) The temperature where the polymer melts into a liquid
- C) The range where the material loses its refractive index
- D) The point of thermal degradation

11. Which type of firearm rifling produces a distinctive 'land and groove' impression due to the cutting process?

- A) Broach rifling
- B) Polygonal rifling
- C) Button rifling
- D) Hammer forging

12. What does the 'Kerckhoffs's principle' imply in the context of forensic digital cryptography?

- A) Security should rely on the secrecy of the key, not the algorithm
- B) Encryption must be based on prime number factorization
- C) Digital evidence is immutable if hashed
- D) Steganography is easily detected via entropy analysis

13. Which skeletal feature is used to estimate the age of an adult individual using the Suchey-Brooks system?

- A) Pubic symphysis
- B) Cranial sutures
- C) Clavicle epiphysis
- D) Dental attrition

14. In soil analysis, which mineral is most frequently utilized for 'geological fingerprinting' due to its resistance to weathering?

- A) Zircon
- B) Calcite
- C) Gypsum
- D) Halite

15. What is the primary mechanism of action for the 'Cyanoacrylate fuming' method in latent print development?

- A) Polymerization on the ridges
- B) Oxidation of amino acids
- C) Fluorescence under UV light
- D) Precipitation of silver salts

16. Which forensic instrument is best suited for the elemental analysis of trace glass fragments?

- A) Scanning Electron Microscopy with Energy Dispersive X-ray (SEM-EDX)
- B) Gas Chromatography
- C) Mass Spectrometry
- D) Polarized Light Microscopy

17. What is the term for the tendency of a bullet to follow a curved path due to the rotation imparted by rifling?

- A) Gyroscopic precession
- B) Yaw
- C) Magnus effect
- D) Drag coefficient

18. Which entomological stage is used to estimate the Post-Mortem Interval (PMI) when dealing with necrophagous Diptera?

- A) Larval instar progression
- B) Adult emergence
- C) Pupal eclosion
- D) Egg hatching duration

19. In forensic odontology, which classification system uses the 'FDI World Dental Federation' notation to identify teeth?

- A) ISO 3950
- B) Universal Numbering System
- C) Palmer Notation
- D) Zsigmondy system

20. Which phenomenon explains the separation of components in paper chromatography based on their solubility?

- A) Differential partitioning
- B) Capillary action
- C) Molecular weight exclusion
- D) Adsorption kinetics