

Advanced Forensic Biological Sciences

Forensic Science · Practice Test · 25 Questions

1. What is the specific temperature-dependent process occurring in the eyes that allows for the estimation of the post-mortem interval (PMI) via potassium concentration?

- A) Vitreous humor sequestration
- B) Corneal clouding
- C) Aqueous humor evaporation
- D) Retinal detachment

2. Which physiological process is responsible for the phenomenon of 'tache noire' in an unburied corpse?

- A) Bacterial putrefaction
- B) Dehydration of the sclera
- C) Hemolysis of ocular capillaries
- D) Post-mortem hypostasis

3. In forensic toxicology, what is the 'post-mortem redistribution' phenomenon primarily associated with?

- A) Drug movement from solid organs to the blood
- B) The evaporation of volatile poisons
- C) Rapid decomposition of bile
- D) The migration of skin cells into muscle

4. What is the primary cause of 'adipocere' formation in a decomposing body?

- A) Hydrolysis of subcutaneous adipose tissue
- B) Calcification of muscle fibers
- C) Denaturation of collagen proteins
- D) Oxidation of skin lipids

5. During rigor mortis, what specific chemical depletion at the cellular level prevents the detachment of actin-myosin filaments?

- A) Calcium ions
- B) Adenosine triphosphate (ATP)
- C) Lactic acid
- D) Creatine phosphate

6. Which phase of decomposition is characterized by the presence of 'marbling' caused by the reaction of hydrogen sulfide with hemoglobin?

- A) Bloat
- B) Active decay
- C) Advanced decay
- D) Putrefaction

7. What is the term for the pink staining of the inner walls of blood vessels that occurs post-mortem due to hemoglobin diffusion?

- A) Vascular engorgement
- B) Imbibition of staining
- C) Arterial spasm
- D) Heme-fixation

8. Which organ exhibits the highest rate of post-mortem autolysis due to its high concentration of digestive enzymes?

- A) Pancreas
- B) Liver
- C) Kidney
- D) Spleen

9. What is the clinical term for the mechanism where the blood pressure remains high at the moment of death, resulting in petechial hemorrhages?

- A) Asphyxial syndrome
- B) Tardieu spots
- C) Vagal inhibition
- D) Capillary rupture

10. In forensic odontology, what is the most reliable method for estimating age in adult remains?

- A) Gustafson's method
- B) Tooth eruption timing
- C) Dental caries index
- D) Enamel hypoplasia depth

11. What is the primary metabolite tested in hair to detect chronic heavy metal exposure in forensic investigations?

- A) Keratin sulfur complexes
- B) Chelated metallic ions
- C) Albumin-bound minerals
- D) Melanin-sequestered elements

12. What physiological change occurs in the skin immediately surrounding an electrical entry wound, often referred to as 'metallization'?

- A) Thermal coagulation
- B) Epidermal vapor explosion
- C) Metallic ion transfer from the conductor
- D) Carbonization of the dermis

13. Which skeletal feature is considered the most accurate for determining sex in an adult skeleton?

- A) Femur length
- B) Pelvis morphology
- C) Skull circumference
- D) Sternum density

14. What is the significance of the 'diatom test' in cases of suspected drowning?

- A) Detection of algae in bone marrow
- B) Identification of salt water in lungs
- C) Presence of plankton in the stomach
- D) Tracing riverbed silt in the pharynx

15. What substance is analyzed in the vitreous humor to differentiate between diabetic ketoacidosis and post-mortem ketosis?

- A) Glucose and beta-hydroxybutyrate
- B) Insulin and glucagon
- C) Glycogen and lactate
- D) Pyruvate and urea

16. What is the characteristic 'cherry-pink' lividity of a corpse indicative of?

- A) Carbon monoxide poisoning
- B) Cyanide toxicity
- C) Hypothermia
- D) High altitude edema

17. In forensic biology, what does the presence of 'spermine' in a stain confirm?

- A) The presence of semen
- B) The presence of saliva
- C) The presence of vaginal fluid
- D) The presence of sweat

18. What does the 'Kelvin-Helmholtz' instability phenomenon relate to in the context of forensic fluid dynamics?

- A) Blood spatter pattern geometry
- B) Gas bubble movement in tissues
- C) Decomposition fluid drainage
- D) Skeletal joint dislocation

19. Which type of cell is the first to arrive at a site of injury or trauma in a living person, and thus serves as a forensic indicator of vital reaction?

- A) Neutrophil
- B) Lymphocyte
- C) Eosinophil
- D) Monocyte

20. What occurs to the body's pH levels immediately following death as a result of anaerobic glycolysis?

- A) It increases to alkaline levels
- B) It decreases towards acidic levels
- C) It remains neutral
- D) It fluctuates rhythmically

21. Which specific bone is most frequently used to estimate stature in forensic anthropology?

- A) Femur
- B) Humerus
- C) Tibia
- D) Radius

22. What is the cause of 'scabbard trachea' often observed in cases of chronic upper airway compression?

- A) Lateral compression of the tracheal rings
- B) Ossification of the thyroid cartilage
- C) Fibrosis of the cricothyroid membrane
- D) Hypertrophy of the tracheal smooth muscle

23. What is the fundamental basis of the 'supra-vital' reaction test used to determine time of death in skeletal muscle?

- A) Response to electrical stimulation
- B) Reaction to chemical reagents
- C) Color change in muscle tissue
- D) Temperature decay rate

24. Which chemical compound is the primary byproduct responsible for the characteristic odor of decomposition?

- A) Putrescine
- B) Formaldehyde
- C) Ethane
- D) Acetone

25. What is the 'Haller's layer' in the context of forensic examination of the human eye?

- A) The vascular layer of the choroid
- B) The epithelial lining of the conjunctiva
- C) The nerve fiber layer of the retina
- D) The basement membrane of the cornea