TOPIC -> FORENSIC BIOLOGY & SEROLOGY (50 M.C.Q)

Q1. The confirmatory microcrystal test that produces rhombic crystals using pyridine and glucose is:
A) Teichmann test
B) Takayama test
C) Kastle-Meyer test
D) Benzidine test

Q2. In dried bloodstains older than several months, which hemoglobin derivative predominates?
A) Oxyhemoglobin
B) Carboxyhemoglobin
C) Methemoglobin
D) Hemichrome

Q3. The most reliable indicator that a stain is of seminal origin rather than vaginal secretion is detection of:
A) Acid phosphatase
B) Choline
C) PSA/p30 antigen
D) Fructose

Q4. Medullary index greater than 0.5 is characteristic of:
A) Mongoloid hair
B) Human beard hair
C) Animal hair
D) Chemically treated hair

Q5. Which fiber shows a characteristic "dog-bone" (or dumbbell) cross-section?
A) Nylon
B) Polyester
C) Acrylic (or certain Spandex/Rayon types)
D) Cotton

Q6. Diatoms assist in drowning diagnosis primarily because they:
A) Produce toxins
B) Resist digestion and enter circulation
C) Grow only in lungs
D) React with hemoglobin

Q7. In PCR, the step most sensitive to temperature variation is:
A) Denaturation
B) Annealing
C) Extension
D) Final hold

Q8. RFLP analysis fails primarily when DNA is:
A) Too concentrated
B) Degraded
C) Double stranded
D) Nuclear

Q9. The enzyme most commonly used in PCR extension is:
A) Ligase
B) Reverse transcriptase
C) Taq polymerase
D) DNase

Q10. Which biological fluid contains the highest concentration of amylase?
A) Semen
B) Sweat
C) Saliva
D) Urine

Q11. A stain giving strong acid phosphatase reaction but PSA negative most likely indicates:
A) Old semen stain
B) Vaginal fluid
C) Plant secretion
D) Saliva

Q12. The cortex of human hair primarily contains:
A) Keratin fibrils and pigment granules
B) Lipid vacuoles
C) Air chambers
D) Calcium salts

Q13. Cuticle scale pattern most common in humans is:
A) Coronal
B) Spinous
C) Imbricate
D) Serrated

Q14. Pollen grain identification mainly depends on:
A) Size only
B) Color only
C) Exine pattern
D) DNA only

Q15. The major buffering system of blood is:
A) Phosphate
B) Protein
C) Bicarbonate
D) Sulfate

Q16. Which respiratory structure has pseudostratified ciliated epithelium?
A) Alveoli
B) Bronchi
C) Pleura
D) Capillaries

Q17. The enteric nervous system is primarily associated with:
A) Brainstem
B) Spinal cord
C) Gastrointestinal tract
D) Peripheral nerves

Q18. Fructose in semen originates mainly from:
A) Prostate
B) Seminal vesicles
C) Testis
D) Bulbourethral gland

Q19. Wood identification in forensic botany relies most on:
A) Color
B) Density
C) Vessel arrangement
D) Smell

Q20. Which DNA region is most used in modern forensic STR profiling?
A) Introns
B) Exons
C) Tandem repeats
D) Mitochondrial coding genes

Q21. Mitochondrial DNA is especially useful when samples are:
A) Fresh
B) Mixed
C) Degraded
D) Male only

Q22. The primary limitation of mitochondrial DNA typing is:
A) Low copy number
B) Maternal inheritance
C) Nuclear instability
D) PCR incompatibility

Q23. A positive Kastle-Meyer test depends on oxidation of:
A) Phenolphthalin
B) Benzidine
C) Luminol
D) Leuco crystal violet

Q24. Luminol reaction emits light due to:
A) Hydrolysis
B) Chemiluminescence
C) Fluorescence
D) Phosphorescence

Q25. Which fiber melts and forms a bead when burned?
A) Wool
B) Cotton
C) Nylon
D) Linen

Q26. Nuclear DNA polymorphism mainly arises due to:
A) Replication errors
B) Ribosomal mutation
C) Transcription
D) Translation

Q27. The zona pellucida surrounds:
A) Sperm head
B) Ovum
C) Blastocyst
D) Zygote nucleus

Q28. Which stain is most resistant to environmental degradation?
A) Saliva
B) Blood
C) Urine
D) Sweat

Q29. A hair specimen that has been forcibly removed from the scalp is most likely to exhibit:
A) A club-shaped root (Telogen)
B) A follicular tag (Anagen root)
C) A naturally shed root
D) A dry, withered appearance

Q30. The comparison microscope was pioneered in forensic ballistics but later adapted for:
A) Fiber only
B) DNA only
C) Hair comparison
D) Blood typing

Q31. The medulla pattern most common in animal hair is:
A) Fragmented
B) Continuous
C) Absent
D) Interrupted

Q32. Which PCR error increases with cycle number?
A) Strand break
B) Misincorporation
C) Hybridization loss
D) Template loss

Q33. The best confirmatory test for saliva is detection of:
A) Urea
B) Creatinine
C) α-amylase
D) Lactate

Q34. Diatom testing commonly uses digestion with:
A) HCl
B) HNO_3
C) NaOH
D) Ethanol

Q35. The primary structural unit of fiber polymers is:
A) Amino acid
B) Monomer
C) Enzyme
D) Lipid

Q36. Restriction enzymes cut DNA at:
A) Random sites
B) Promoter regions
C) Specific sequences
D) Introns only

Q37. Which blood cell lacks a nucleus?
A) Neutrophil
B) RBC
C) Lymphocyte
D) Monocyte

Q38. PSA is produced by:
A) Testis
B) Seminal vesicle
C) Prostate
D) Epididymis

Q39. Which botanical evidence is most persistent over time?
A) Leaves
B) Flowers
C) Pollen
D) Fruit pulp

Q40. Keratin in hair is rich in:
A) Glycine
B) Cysteine
C) Lysine
D) Tyrosine

Q41. The annealing temperature in PCR is determined mainly by:
A) Polymerase type
B) Primer melting temperature
C) Template length
D) Buffer pH

Q42. Which test differentiates human from animal blood immunologically?
A) Benzidine
B) Precipitin
C) Takayama
D) Kastle-Meyer

Q43. Urine identification commonly uses detection of:
A) Glucose
B) Creatinine
C) Protein
D) Chloride

Q44. Fiber birefringence is examined using:
A) UV microscope
B) Polarized light microscope
C) Electron microscope
D) Phase contrast

Q45. The thickest layer of hair shaft is:
A) Cuticle
B) Cortex
C) Medulla
D) Root sheath

Q46. STR loci are amplified using:
A) Southern blot
B) PCR
C) RFLP only
D) Gel filtration

Q47. The digestive enzyme pepsin works best at pH:
A) 2
B) 5
C) 7
D) 9

Q48. Which nervous system division controls involuntary organs?
A) Somatic
B) Autonomic
C) Central
D) Sensory

Q49. Seminal stain fluorescence under ALS is mainly due to:
A) Fructose
B) Flavins
C) PSA
D) Protease

Q50. DNA profiling discrimination power increases with:
A) Fewer loci
B) Linked loci
C) More independent STR loci
D) Mitochondrial markers only

Answer Key

1-B, 2-D, 3-C, 4-C, 5-C, 6-B, 7-B, 8-B, 9-C, 10-C, 11-B, 12-A, 13-C, 14-C, 15-C, 16-B, 17-C, 18-B, 19-C, 20-C, 21-C, 22-B, 23-A, 24-B, 25-C, 26-A, 27-B, 28-B, 29-B, 30-C, 31-B, 32-B, 33-C, 34-B, 35-B, 36-C, 37-B, 38-C, 39-C, 40-B, 41-B, 42-B, 43-B, 44-B, 45-B, 46-B, 47-A, 48-B, 49-B, 50-C

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