

P.G. ENTRANCE EXAMINATION, APRIL 2024**FORENSIC SCIENCE****Time : Two Hours****Maximum : 400 Marks**

1. Both light and sound waves produce diffraction. It is more difficult to observe diffraction with light waves because :
 - (a) Light waves do not require medium.
 - (b) Light waves are transverse waves.
 - (c) Speed of light is far greater.
 - (d) Wavelength of light waves is far smaller.
2. Consider the following two statements A and B, and identify the correct choice in the following :
 - (A) Viscosity of liquids decreases with decrease of temperature.
 - (B) Surface tension of a liquid decreases with increase of temperature.
 - (a) Both A and B are true.
 - (b) A is false but B is true.
 - (c) Both A and B are false.
 - (d) A is true but B is false.
3. In a compound microscope, the intermediate image is :
 - (a) Virtual, erect and magnified.
 - (b) Real, erect and magnified.
 - (c) Virtual, erect and reduced.
 - (d) Real, inverted and magnified.
4. The unit of Young's modulus is :
 - (a) Dynes per cm.
 - (b) Dynes/sq cm.
 - (c) Dynes / cc.
 - (d) Ergs/sq cm.
5. The physical quantity that has dimensions :
 - (a) Angular velocity.
 - (b) Linear momentum.
 - (c) Strain.
 - (d) Angular momentum.

Turn over

7. A wooden block of mass 10 gm is dropped from the top of a cliff 100 m high. Simultaneously a bullet of mass 10 gm is fired from the foot of the cliff upward with a velocity of 100 m/s. The bullet and the wooden block will meet each other, after a time in seconds.
- (a) 10. (b) 0.5.
(c) 7. (d) 1.
8. A bullet fired into a fixed target loses half of its velocity in penetrating 15 cm. How much further it will penetrate before coming to rest ?
- (a) 15 cm. (b) 7.5 cm.
(c) 10 cm. (d) 5 cm.
9. In an inelastic collision between two bodies the physical quantity that is conserved :
- (a) Potential energy. (b) Kinetic energy.
(c) Momentum. (d) Kinetic energy and momentum.
10. A machine gun fires 10 bullets per sec. The mass of each bullet is 10 gm. If the force exerted by the machine gun is 100 N. What is the velocity of each bullet ?
- (a) 1000 m/s. (b) 100 m/s.
(c) 10 m/s. (d) 50 m/s.
11. The power of a pump that raises 100 kg of water in 10 sec to a height of 100 m is _____ K watts :
- (a) 9.8. (b) 10.8.
(c) 11.8. (d) 12.8.
12. The total linear momentum of a system consisting of N number of particles about the centre of mass is :
- (a) Constant.
(b) Maximum.
(c) Zero.
(d) None of the above.
13. A car is moving at 90 km per hour. What is the minimum time in which the car can come to rest if the co-efficient of friction between the car and the road is 0.4 ?
- (a) 6 s. (b) 6.38 s.
(c) 7s. (d) 8 s.

6. Out of the following which is not a scalar quantity ?
- (a) Momentum. (b) Time.
(c) Volume. (d) Density.
14. Earth is flattened at poles, bulged at the equator. This is due to the centrifugal forces more at the equator than at the poles
- (a) Earth revolves around the sun in an elliptical orbit
(b) The centrifugal force is more at the equator than at the poles.
(c) The angular velocity of spinning about its axis is more at the equator.
(d) None of the above.
15. A missile is launched with a velocity less than the escape velocity. The sum of its kinetic and potential energy is :
- (a) May be positive or negative depending upon its initial velocity.
(b) Positive.
(c) Negative.
(d) Zero.
16. The water droplets merge with each other to form a larger drop. In the process :
- (a) Energy is absorbed. (b) Energy is liberated.
(c) Energy is neither liberated nor. (d) None.
17. The law that leads to absolute, scale of temperature is :
- (a) Kelvin's law. (b) Boyle's law.
(c) Charle's law. (d) None of the above.
18. Equal masses of sand and water are kept in identical calorimeters. Both are heated at the same time. Which will be at a higher temperature ?
- (a) Water. (b) Sand.
(c) Both at same temperature. (d) None.
19. Sound waves do not show in the air :
- (a) Refraction. (b) Polarisation.
(c) Diffraction. (d) Reflection.
20. The astronaut in the spaceship sees the sky as :
- (a) Black. (b) White.
(c) Blue. (d) Red.

21. Newton postulated his corpuscular theory of light based on :

- (a) Newton's rings.
- (b) Rectilinear propagation of light.
- (c) Dispersion of white light into colours.
- (d) Colours of thin films.

22. Magnetic length is :

- (a) Less than geometric length.
- (b) Greater than geometric length.
- (c) Equal to geometric length.
- (d) May be any of the above.

23. Cork is a good insulator because it is _____.

- (a) Devoid of free electrons.
- (b) Having more electrons.
- (c) Having less electrons.
- (d) Neutral electrons.

24. The resistance of an ideal voltmeter is :

- (a) Infinity.
- (b) Zero.
- (c) 1000.
- (d) 500.

25. Two parallel wires carrying currents in the same direction attract each other because of :

- (a) Potential difference between them.
- (b) Mutual inductance between them.
- (c) Magnetic forces between them.
- (d) Electric forces between them.

26. The tendency of an atom to attract the bonded pair of electrons towards it in a covalent molecule is known as :

- (a) Ionization energy.
- (b) Crystal lattice energy.
- (c) Electron affinity.
- (d) Electronegativity.

27. The shape of chloroform is :
(a) Planar. (b) Angular.
(c) Distorted Tetrahedral. (d) Tetrahedral
28. H-bonding is absent in :
(a) Ammonia. (b) Water.
(c) Ether. (d) Alcohol.
29. Which of the following gases will have the greatest rate of diffusion ?
(a) N_2 . (b) CO_2 .
(c) O_2 . (d) NH_3 .
30. H_2O_2 does not act as :
(a) Reducing agent. (b) Oxidizing agent.
(c) Bleaching agent. (d) Dehydrating agent.
31. The oxidation number of Mn in $KMnO_4$.
(a) 0. (b) +3.
(c) +5. (d) +7.
32. Permanent hardness of water is due to the presence of :
(a) Chlorides of Ca and Mg. (b) Sulphates of Ca and Mg.
(c) Both a and b. (d) None of the above.
33. In case of alkali metals :
(a) The cation is less stable than the atom.
(b) The cation is larger than the atom.
(c) The cation is smaller than the atom.
(d) The cation and the atom have about the same size.
34. Mortar is a mixture of :
(a) Lime and H_2O . (b) Lime and sand.
(c) Lime, coke and sand. (d) Lime, sand and H_2O .

35. Magnalium is :

- (a) A mineral of Mg.
- (b) An alloy of Mg + Zn.
- (c) An alloy of Mg + Al.
- (d) An alloy of Cu + Zn.

36. The alum used for purifying water is :

- (a) Potash alum.
- (b) Ammonium alum.
- (c) Chrome alum.
- (d) Ferric alum.

37. The molecular form of inert form of C is :

- (a) Graphite.
- (b) Diamond.
- (c) Coal.
- (d) Charcoal.

38. Enantiomers must have :

- (a) Super impossible structures.
- (b) Non super impossible structures.
- (c) Different physical properties.
- (d) Different chemical properties.

39. Which of the following will have highest boiling point ?

- (a) Iso octane.
- (b) Propane.
- (c) n-octane.
- (d) n-butane.

40. An inert gas used in fuel pressure systems :

- (a) Xe.
- (b) Kr.
- (c) Ar.
- (d) He.

41. Untreated domestic sewage has a low :

- (a) % dissolved Q_2 .
- (b) BOD value.
- (c) Amounts of dissolved salts.
- (d) % of suspended organic matter.

42. The element with highest boiling point in the following is :

- (a) Oxygen.
- (b) Sulphur.
- (c) Polonium.
- (d) Tellurium.

43. Which sterilizes water ?
- (a) CO_2 . (b) N_2 .
(c) O_3 . (d) SO_3 .
44. Which of the following is the most stable ?
- (a) HI. (b) HF.
(c) HCL. (d) HBr.
45. Which of the following is not ferromagnetic ?
- (a) Mn. (b) Fe.
(c) Co. (d) Ni.
46. With increase in temperature, the value of the rate constant of a reaction generally :
- (a) Decreases. (b) Increases.
(c) May increase or decrease. (d) May not change.
47. For a reversible reaction, if the concentrations of the reactants are doubled then the equilibrium constant value :
- (a) Gets doubled. (b) Gets halved.
(c) Increases four times. (d) Remains the same.
48. The enthalpy of formation of KNO_3 is +36 kcal. In this reaction :
- (a) Energy is absorbed. (b) Energy is liberated.
(c) KNO_3 is stable. (d) KNO_3 is unstable.
49. IUPAC stands for :
- (a) International Union of Pure and Applied Chemistry.
(b) Indian Union of Pure and Applied Chemistry.
(c) International Unit of Pure and Applied Chemistry.
(d) Indian Unit of Pure and Applied Chemistry.
50. Number of known elements till date in the periodic table are :
- (a) 118. (b) 128.
(c) 108. (d) 98.

51. Which pattern of fingerprint resembles bulls eye ?
- (a) Whorl. (b) Loop.
(c) Arch. (d) Composite.
52. _____ constitute the smokeless powder.
- (a) Nitroglycerin.
(b) Charcoal.
(c) Ammonium Nitrate.
(d) Potassium Nitrate.
53. Stabilization of charred document can be done by spraying :
- (a) Polyvinyl acetate. (b) Starch solution.
(c) Glycerin. (d) Cedar oil.
54. Sex determination can be easily done from which bone among the following :
- (a) Femur. (b) Mandible.
(c) Skull. (d) Pelvis.
55. Microcrystal test for blood is a :
- (a) Qualitative test. (b) Presumptive test.
(c) Confirmatory test. (d) Quantitative test.
56. _____ introduced a more comprehensive approach that requires judges to scrutinize not only the expert's methodology but also the underlying scientific principles.
- (a) Daubert case. (b) Frye case.
(c) Prakash Singh case. (d) Lalji Singh case.
57. In India, the DNA technology was introduced for the first time in the court in which State ?
- (a) Tamil Nadu. (b) Uttar Pradesh.
(c) Kerala. (d) Gujarat.
58. PMI refers to :
- (a) Postmortem Interval. (b) Postmodern Interval.
(c) Post Matter Interval. (d) None of the above.

59. The style or method that a criminal uses when committing a crime is known as :
- (a) Modus Operandi.
 - (b) Actus Reus.
 - (c) Mens Rea.
 - (d) Corpus delicti.
60. In Takayama test _____ crystals are seen.
- (a) Pyridine ferroprotoporphyrin.
 - (b) Haematin.
 - (c) Both (a) and (b).
 - (d) Pyridine.
61. Exemplars in forensic science refers to :
- (a) Known evidence.
 - (b) Unknown evidence.
 - (c) Both a and b.
 - (d) Curtail evidence.
62. Chain of custody refers to :
- (a) Continuous custody of evidence.
 - (b) Report of evidence.
 - (c) Custody of the accused.
 - (d) Detailed record of evidence till it is delivered to court.
63. _____ is a visible fingerprint impression deposited by contact with a soft material.
- (a) Latent fingerprint.
 - (b) Patent fingerprint.
 - (c) Plastic fingerprint.
 - (d) Pattern fingerprint.
64. Bloodshed that travels under the influence of gravity only is known as :
- (a) Passive bloodstains.
 - (b) Active bloodstains.
 - (c) Transfer bloodstains.
 - (d) Projected bloodstains.
65. Tetrahydrocannabinol is present in :
- (a) Cannabis.
 - (b) Datura.
 - (c) Poppy plant.
 - (d) Magic Mushroom.

66. _____ is generally used for discovering the locations of files among the data on a physical medium that are more useful as evidence than the file system itself.
- (a) File System Forensics.
 - (b) Memory forensics.
 - (c) Malware Forensics.
 - (d) Firewall Forensics.
67. _____ receives and decodes instructions from memory in a computer.
- (a) UPS.
 - (b) CPU.
 - (c) Hard drive.
 - (d) Monitor.
68. The process of converting message or data into code is known as :
- (a) Decoding.
 - (b) Encoding.
 - (c) Hashing.
 - (d) Coding.
69. FAT refers to :
- (a) File Allocation Table.
 - (b) File Approval Table.
 - (c) Final Allocation Table.
 - (d) Final Allotment Table.
70. _____ validates that the digital investigator has not altered the integrity of the acquired data.
- (a) Marking.
 - (b) Hashing.
 - (c) Looping.
 - (d) Storing.
71. _____ prevent the examiner from "writing" or "altering" the digital information that is being collected and analyzed.
- (a) Right blockers.
 - (b) Data sets.
 - (c) Write blockers.
 - (d) Write encrypts.
72. R-Studio is a :
- (a) Data recovery software.
 - (b) Data deletion software.
 - (c) Imaging software.
 - (d) None of the above.

73. In _____ the embedded data are used to place an indication of ownership in the host signal and/or to ensure the integrity of the content.
- (a) Tamper-proofing.
 - (b) Digital watermarking.
 - (c) Both a and b.
 - (d) Secret communication.
74. Any file that has been logically erased from the file system but may still remain physically on storage media.
- (a) Deleted file.
 - (b) Moved file.
 - (c) Removed file.
 - (d) Erased file.
75. The Forensic Tool Kit (FTK) is a product developed by :
- (a) FTK company.
 - (b) Forensic FTK.
 - (c) AccessData.
 - (d) None of the above.
76. Angiotensinogen is produced by :
- (a) Kidney.
 - (b) Liver.
 - (c) Lungs.
 - (d) Brain.
77. ADH is synthesized and released by :
- (a) Pituitary gland and Hypothalamus.
 - (b) Hypothalamus and Pituitary gland.
 - (c) Pineal gland and Hypothalamus.
 - (d) Adrenal gland and Pituitary gland.
78. A hydronium ion :
- (a) Has the structure H_3O^+ .
 - (b) Is a hydrated proton.
 - (c) One of the dissociated products of water.
 - (d) All the above.
79. The oxygen dissociation curve shifts to the right by all of the following except :
- (a) Increased $[\text{H}^+]$.
 - (b) pCO_2 .
 - (c) Increase temperature.
 - (d) Carbon monoxide.

80. One hemoglobin carries ————— molecules of oxygen.
- (a) 6. (b) 3.
(c) 4. (d) 2.
81. The brain controls the heart rate by sending neural messages to the sinoatrial node which is located in the :
- (a) Left atrium. (b) Right atrium.
(c) Right ventricle. (d) Left ventricle
82. The opening of the right atrium into the right ventricle is guarded by :
- (a) Mitral valve. (b) Tricuspid valve.
(c) Bicuspid valve. (d) Aortic semilunar valve.
83. Chloride shift occurs in response to transport :
- (a) H^+ . (b) K^+ .
(c) HCO_3^- . (d) Na^+
84. The transporter that carries glucose and galactose into the enterocyte is :
- (a) SGLUT. (b) GLUT5.
(c) Na^+ /glucose cotransporter. (d) GLUT1.
85. Which of the following is the enzyme that acts on the polysaccharides ?
- (a) Lactase. (b) Amylase.
(c) Maltase. (d) Sucrase.
86. Which of the following pair/s act synergetically ?
- (a) Gastrin and Secretin.
(b) Gastrin and Enterogastrin.
(c) Secretin and Cholecystokinin.
(d) Duocrinin and Villikinin.
87. Pick the wrong pair :
- (a) Typhlosole - cyclostomes.
(b) Scroll valve - Sharks.
(c) Valvulae conniventes - humans.
(d) Spiral valve - cockroaches.

88. Heartbeat initiates from :
- (a) Purkinji fibers.
 - (b) SA node
 - (c) Bundle of HIS.
 - (d) Auriculo ventricular node.
89. The P wave of the ECG represents :
- (a) Ventricular depolarization.
 - (b) Atrial depolarization.
 - (c) Ventricular repolarization
 - (d) Atrial systole.
90. What is the shape of the Haemoglobin-oxygen dissociation curve ?
- (a) Straight.
 - (b) Constant.
 - (c) Hyperbolic.
 - (d) Sigmoid.
91. Aciculum is an :
- (a) Large and strong bristle embedded in the middle of notopodium/ neuropodium
 - (b) Membraneous sac in which setae are lodged in.
 - (c) An internal supporting skeleton of trunk.
 - (d) A type of setal muscles.
92. Which of the following pairs is correct with regards to *Neries diversicolor* ?
1. Retractor muscle - retraction of introvert.
 2. Digestive enzymes - oesophageal diverticula.
 3. Protractor muscle - eversion of bucco-pharynx.
 4. Peristalsis—intestine.
- (a) 1,2, and 4.
 - (b) 1,3, and 4.
 - (c) 2,3, and 4.
 - (d) All the above.

93. Which of the following microscope/s is useful for studying a living cell without staining ?
- (a) SEM. (b) TEM
- (c) Phase contrast microscope. (d) Fluorescent microscope.
94. Which of the following chemical mutagen/s affects the replicating DNA ?
- (a) Acridine dye. (b) Base analog.
- (c) Alkylating agent. (d) Deaminating agent.
95. Paramecium reproduces by :
- (a) Binary fission. (b) Conjugation.
- (c) Binary fission and conjugation. (d) Budding.
96. Which of the following pair/s is mismatched ?
- (a) Glass sponges - Hexactinellida. (b) Spongilla - Zoochlorella.
- (c) Scypha - Urn Sponge. (d) Leucosolenia - Rock sponges
97. Which of the following is not a form of polymorphism ?
- (a) Nectocalyces. (b) Dactylozooids.
- (c) Pneumatophores. (d) Statocys.
98. Ctenophores are commonly known as :
- (a) Combfish. (b) Combjellies.
- (c) Jellyfish. (d) Starfish.
99. What is the purpose of adding SDS and 2-mercaptoethanol in SDS-PAGE ? Choose the correct combination
- (a) To remove impurities; increase protein mobility.
- (b) To denature proteins; cleave disulfide bonds.
- (c) To reduce protein charges; maintain protein charges.
- (d) To increase, protein size; reduce the size of the protein.
100. Glia that provides myelin for neurons in the brain is called _____.
- (a) Schwann cells. (b) Oligodendrocytes.
- (c) Microglia. (d) Astrocytes.