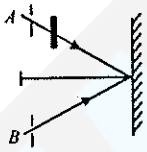
SOLVED PAPER
AIIMS - 1999

Time : 3½ Hours Max. Marks : 200

PHYSICS

1. The reaction responsible for the production of light energy from the sun is
(a) fission (b) nuclear
(c) fusion (d) none of these.

2. In Young's experiment, the monochromatic light is used to illuminate two slits A and B as shown. Interference fringes are observed on a screen placed in front of the slits. Now if a thin glass plate is placed normally in the path of beam coming from the slit A, then

(a) fringe width will decrease
(b) fringes will disappear
(c) fringe width will increase
(d) there will be no change in fringe width.

3. A charged particle enters in a magnetic field H with its initial velocity making an angle of 45° with H. The path of the particle will be
(a) an ellipse (b) a straight line
(c) a circle (d) a helical.

4. Diode is used as a/an
(a) rectifier (b) oscillator
(c) amplifier (d) modulator.

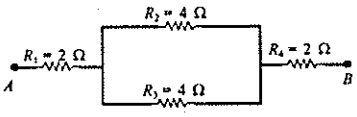
5. In n-type semiconductors, majority charge carriers are
(a) protons (b) holes
(c) neutrons (d) electrons.

6. When n-p-n transistor is used as an amplifier, then
(a) holes move from emitter to base
(b) electrons move from base to collector
(c) holes move from base to emitter
(d) electrons move from collector to base.

7. Two identical galvanometers are converted into an ammeter and a milliammeter. The shunt, which has more resistance due to the current passing through the coil will be
(a) less (b) equal
(c) more (d) zero.

8. Energy is not carried by which of the following wave?
(a) electromagnetic (b) transverse
(c) stationary (d) progressive.

9. A choke coil has
(a) low inductance and high resistance
(b) high inductance and low resistance
(c) low inductance and low resistance
(d) high inductance and high resistance.

10. In the figure, the equivalent resistance between the points A and B is
(a) 8 Ω
(b) 6 Ω
(c) 2 Ω
(d) 4 Ω.


11. Boolean algebra is essentially based on
(a) truth (b) numbers
(c) symbol (d) logic.

12. A triode valve has an amplification factor of 20 and its plate is given a potential of 300 V. What should be the grid voltage to reduce the plate-current to zero?
(a) 15 V (b) 8 V
(c) 25 V (d) 12 V.

13. Which of the following is used as a moderator in nuclear reaction?
(a) plutonium (b) cadmium
(c) uranium (d) heavy water.

14. When cathode rays strike a metal target of high melting point with a very high velocity, then which of the following are produced?
(a) α-rays (b) ultrasonic waves
(c) X-rays (d) γ-waves.

15. According to the Bohr theory, relation between main quantum number n and radius of orbit r is

(a) $r \propto n$ (b) $r \propto 1/n$
(c) $r \propto n^2$ (d) $r \propto 1/n^2$.

16. Two identical conductors of copper and aluminium are placed in an identical electric field. The magnitude of induced charge in the aluminium will be
(a) greater than in copper
(b) zero
(c) less than in copper
(d) equal to that in copper.

17. The number of electrons for one coulomb of charge is
(a) 6.25×10^{23} (b) 6.25×10^{21}
(c) 6.25×10^{19} (d) 6.25×10^{18}.

18. Relation between critical angle of water and the glass is
(a) $C_w = C_g = 0$ (b) $C_w = C_g$
(c) $C_w > C_g$ (d) $C_w < C_g$.

19. SONAR emits which of the following waves?
(a) ultrasound (b) radio
(c) light (d) none of these.

20. If a magnetic material, moves from stronger to weaker parts of a magnetic field, then it is known as
(a) paramagnetic (b) ferromagnetic
(c) diamagnetic (d) ani-ferromagnetic.

21. Angle of dip is 90° at
(a) equator (b) poles
(c) both (a) and (b) (d) none of these.

22. If the rotational velocity of a dynamo armature is doubled, then the induced e.m.f. will become
(a) half (b) two times
(c) four times (d) unchanged.

23. Which of the following quantity is increased in a step-down transformer?
(a) voltage (b) current
(c) power (d) frequency.

24. Quantity that remains unchanged in a transformer is
(a) voltage (b) frequency
(c) current (d) none of these.

25. At a common temperature, a block of wood and a block of metal feel equally cool or hot. The temperatures of metal and wood are
(a) less than the temperature of the body
(b) equal to the temperature of the body
(c) greater than the temperature of the body
(d) either (a) or (c).

26. Interference occurs in which of the following waves?
(a) transverse (b) longitudinal
(c) electromagnetic (d) all of these.

27. Sky appears to be blue in clear atmosphere due to light's
(a) scattering (b) diffraction
(c) dispersion (d) all of these.

28. The primary winding of a transformer has 500 turns and its secondary has 5000 turns. If primary is connected to a.c. supply of 20 V and 50 Hz, then secondary will have an output of
(a) 200 V, 50 Hz (b) 2 V, 5 Hz
(c) 2 V, 50 Hz (d) 200 V, 500 Hz.

29. When a magnetic substance is heated, then it
(a) remains the same
(b) loses its magnetism
(c) becomes a strong magnet
(d) either (a) or (c).

30. The north pole of a magnet is brought near a metallic ring. The direction of the induced current in the ring will be
(a) towards south (b) towards north
(c) anti-clockwise (d) clockwise.

31. If vibrations of a string are to be increased by a factor two, then tension in the string must be made
(a) four times (b) half
(c) twice (d) eight times.

32. The average kinetic energy of a gas molecules at 27°C is 6.21×10^{-21} J. Its average kinetic energy at 227°C will be
(a) 10.35×10^{-21} J (b) 52.2×10^{-21} J
(c) 5.22×10^{-21} J (d) 11.35×10^{-21} J.

33. In an adiabatic process, the quantity which remains constant is
(a) pressure
(b) volume
(c) temperature
(d) total heat of the system.

34. If a cyclist moving with a speed of 4.9 m/s on a level road can take a sharp circular turn of radius 4 m, then coefficient of friction between the cycle tyres and road is
(a) 0.51 (b) 0.41
(c) 0.71 (d) 0.61.

35. A particle executes simple harmonic motion with an angular velocity and maximum acceleration of 3.5 rad/sec and 7.5 m/s^2 respectively. Amplitude of the oscillation is
(a) 0.36 (b) 0.28
(c) 0.61 (d) 0.53.

36. A particle of mass m moving with velocity v colloids with a stationary particle of mass $2m$. The speed of the system, after collision, will be
(a) $v/2$ (b) $2v$
(c) $v/3$ (d) $3v$.

37. A stretched rubber has
(a) increased kinetic energy
(b) increased potential energy
(c) decreased kinetic energy
(d) decreased potential energy.

38. Velocity of a body on reaching the point, from which it was projected upwards, is
(a) $v = 2u$ (b) $v = 0$
(c) $v = 0.5u$ (d) $v = u$.

39. If $\vec{P} \cdot \vec{Q} = PQ$, then the angles between $\vec{P}$ and $\vec{Q}$ is
(a) 45° (b) 30°
(c) 60° (d) 0°.

40. How many significant figures are there in 30.00?
(a) 2 (b) 4
(c) 3 (d) 1.

41. Dimensions $[ML^{-1}T^{-1}]$ are related to
(a) torque
(b) work
(c) energy
(d) coefficient of viscosity.

42. The resistance of a galvanometer is 50 Ω and the current required to give full scale deflection is 100 μA. In order to convert into an ammeter for reading upto 10 A, it is necessary to put a resistance of
(a) 5×10^{-5} Ω (b) 5×10^{-3} Ω
(c) 5×10^{-2} Ω (d) 5×10^{-4} Ω.

43. A horizontal platform with an object placed on it is executing SHM in the vertical direction. The amplitude of oscillation is 3.92×10^{-3} m. What must be the least period of these oscillations, so that the object is not detached from the platform?
(a) 0.1556 sec (b) 0.1456 sec
(c) 0.1356 sec (d) 0.1256 sec.

44. Which of the following affects the elasticity of a substance?
(a) impurity of substance
(b) hammering and annaling
(c) change in temperature
(d) all of these.

45. For a particle executing simple harmonic motion, which of the following statements is not correct?
(a) restoring force is maximum at the extreme positions
(b) total energy of the particle always remains the same
(c) restoring force is always directed towards a fixed point
(d) acceleration of the particle is maximum at the equilibrium position.

46. A resonance air column of length 20 cm resonates with a tuning fork of frequency 450 Hz. Ignoring the correction, the velocity of sound in air will be
(a) 920 m/s (b) 720 m/s
(c) 820 m/s (d) 360 m/s.

47. A boy carrying a box on his head is walking on a level road from one place to another on a straight road is doing no work. The statement is
(a) partly correct (b) correct
(c) incorrect (d) insufficient data.

48. When a solid is converted into a gas, directly by heating, then this process is known as
(a) condensation (b) vapourisation
(c) boiling (d) sublimation.

49. The moment of inertia of a regular circular disc of mass 0.4 kg and radius 100 cm about an axis perpendicular to the plane of the disc and passing through its centre is
(a) 0.02 kg-m^2 (b) 0.002 kg-m^2
(c) 0.2 kg-m^2 (d) 2 kg-m^2.

50. Escape velocity of a body when projected from the earth's surface is 11.2 km/s. If it is projected at an angle of 50° from the horizontal, the escape

velocity will be
(a) 11.6 km/s (b) 12.8 km/s
(c) 11.2 km/s (d) 16.2 km/s.

Directions. Q. 51 to 60 : *These questions consist of two statements each, printed as Assertion (A) and Reason (R). While answering these questions you are required to choose any one of the following four responses.*
(a) If both A and R are true, and R is a correct explanation of the A.
(b) If both A and R are true, but R is not a correct explanation of the A.
(c) If A is true, but R is false.
(d) If both A and R are false.

51. *Assertion:* Two adjacent conductors, carrying the same positive charge have a potential difference between them.
Reason: The potential to which a conductor is raised depends upon the charge.

52. *Assertion:* Electrons move away from a region of lower potential to a region of higher potential.
Reason: Since an electron has a negative charge.

53. *Assertion :* The radiation from the sun's surface varies as the fourth power of its absolute temperature.
Reason: The sun is not a black body.

54. *Assertion :* The second postulate of special relativity refers to the velocity of light in vacuum.
Reason: Cerenkov radiation results when particles move through transparent matter at a speed greater than the speed of light in that medium. T is does not violate the second postulate of special relativity.

55. *Assertion :* The kinetic energy of the emitted photo-electrons changes only with a change in the frequency of the incident radiations.
Reason: The kinetic energy of photo-electrons emitted by a photo-sensitive surface depends upon the intensity of the incident radiation.

56. *Assertion:* A hydrogen filled balloon stops rising after it has attained a certain height in the sky.
Reason: The atmospheric pressure decreases with height and becomes zero when maximum height is attained.

57. *Assertion:* Only a change in magnetic flux will maintain an induced current in the coil.
Reason: The presence of large magnetic flux through a coil maintains a current in the coil if the circuit is continuous.

58. *Assertion :* Rydberg's constant varies with the mass number of a given element.
Reason: The reduced mass of the electron is dependent on the mass of the nucleus only.

59. *Assertion:* On a rainy day, it is difficult to drive a car or bus at high speed.
Reason: The value of coefficient of friction is lowered due to wetting of the surface.

60. *Assertion :* Isotopes of an element can be separated by using a mass spectrometer.
Reason: Separation of isotopes is possible because of the difference in electron numbers of isotopes.

CHEMISTRY

61. Atomic orbitals of carbon in carbon dioxide are
(a) sp^2-hybridised (b) sp^3d-hybridised
(c) sp-hybridised (d) sp^3-hybridised.

62. If 300 ml of a gas at 27°C is cooled to 7°C at constant pressure, its final volume will be
(a) 350 ml (b) 540 ml
(c) 135 ml (d) 280 ml.

63. Which of the following will not undergo hydrolysis in water?
(a) ammonium sulphate
(b) sodium sulphate
(c) calcium sulphate
(d) all the salts will hydrolyse.

64. Which of the following statement is true for an electrochemical cell?
(a) H_2 is anode and Cu is cathode
(b) H_2 is cathode and Cu is anode
(c) reduction occurs at H_2 electrode
(d) oxidation occurs at Cu electrode.

65. The radii of F, F^-, O and O^{-2} are in the order of
(a) $O^{2-} > O > F^- > F$ (b) $F^- > O^{2-} > F > O$
(c) $O^{2-} > F^- > F > O$ (d) $O^{2-} > F^- > O > F$.

66. In the reaction:

$$\text{Phenol} \xrightarrow[CHCl_3]{NaOH} A \xrightarrow{H^+} B, \text{ B is identified as}$$

(a) benzaldehyde (b) benzene
(c) benzoic acid (d) salicyaldehyde

67. Which of the following has maximum ionisation potential?

(a) Na (b) K
(c) Be (d) Mg.

68. The size of colloidal particle is
(a) 10^{-12} to 10^{-19} m
(b) 10^{-3} to 10^{-9} m
(c) 10^{-9} to 10^{-12} m (d) 10^{-6} to 10^{-9} m.

69. The solubility in water of sulphates down the Be group is Be > Mg > Ca > Sr > Ba. This is due to
(a) higher co-ordination number
(b) high ionisation number
(c) increasing in melting point
(d) all of these.

70. $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3} X \xrightarrow[FeCl_3]{Cl_2} Y$. In the above sequence Y can be
(a) 3-nitrochlorobenzene
(b) 1-nitrochlorobenzene
(c) 4-nitrochlorobenzene
(d) none of these.

71. Which of the following is the best scientific method to test presence of water in a liquid?
(a) use of litmus paper
(b) taste
(c) smell
(d) use of anhydrous copper sulphate.

72. Which of the following are $_{16}S^{32}$ and $_{15}Pb^{31}$?
(a) isotopes (b) isotones
(c) isobars (d) isomers.

73. Which of the following exhibits the weakest intermolecular forces?
(a) He (b) HCl
(c) NH_3 (d) H_2O.

74. Which of the following does not show electrical conduction?
(a) diamond (b) graphite
(c) sodium (d) potassium.

75. Which of the following transition element shows the highest oxidation state?
(a) Fe (b) Cr
(c) Mn (d) V.

76. The equivalent weight of phosphoric acid (H_3PO_4) in the reaction:
$NaOH + H_3PO_4 \rightarrow NaH_2PO_4 + H_2O$ is
(a) 25 (b) 49
(c) 59 (d) 98.

77. Vinegar is
(a) HCOOH (b) HCHO
(c) CH_3CHO (d) CH_3COOH.

78. Which of the following is a colligative property?
(a) surface tension (b) viscosity
(c) refractive index
(d) osmotic pressure.

79. What is the amount of chlorine evolved, when 2 A of current is passed for 30 minutes in an aqueous solution of NaCl?
(a) 9.81 g (b) 1.32 g
(c) 4.56 g (d) 12.6 g.

80. Pressure in a mixture of 4 g of O_2 and 2 g of H_2 confined in a bulb of 1 litre at 0°C is
(a) 45.215 atm (b) 31.205 atm
(c) 25.215 atm (d) 15.210 atm.

81. The specific conductivity of N/10 KCl solution at 20°C is 0.0212 ohm^{-1} cm^{-1} and the resistance of cell containing this solution at 20° C is 55 ohm. The cell constant is
(a) 2.173 cm^{-1} (b) 1.166 cm^{-1}
(c) 4.616 cm^{-1} (d) 3.324 cm^{-1}.

82. If magnesium atom having atomic number 12 has an isotope with mass number 26, then the number of protons, neutrons and electrons respectively of the atom are
(a) 12, 14, 12 (b) 12, 12, 14
(c) 14, 12, 12 (d) 12, 12, 12.

83. Which of the following compound will not give Cannizzaro's reaction?
(a) $(Me)_3CCHO$ (b) HCHO
(c) CH_3CHO (d) C_6H_5CHO.

84. The rate constant of a first order reaction is 3×10^{-6} per sec. If the initial concentration is 0.10 M, the initial rate of reaction is
(a) 3×10^{-6} Ms^{-1} (b) 3×10^{-5} Ms^{-1}
(c) 3×10^{-8} Ms^{-1} (d) 3×10^{-7} Ms^{-1}.

85. Which oxide of nitrogen is obtained on heating ammonium nitrate at 250°C?
(a) nitrous oxide
(b) nitric oxide
(c) nitrogen dioxide
(d) dinitrogen tetraoxide.

86. Half-life of radium is 1580 years. Its average life will be
(a) 2.275×10^3 years (b) 2.5×10^3 years
(c) 8.825×10^2 years (d) 11.832×10^3 years.

87. The empirical formula of a compound is CH_2O. Its molecular weight is 180. The molecular formula of the compound is
(a) C_4HO_4 (b) $C_5H_{10}O_5$
(c) $C_3H_6O_3$ (d) $C_6H_{12}O_6$.

88. Principal, azimuthal and magnetic quantum numbers are respectively related to
(a) shape, size and orientation
(b) size, shape and orientation
(c) size, orientation and shape
(d) none of these.

89. The common molecular formula for disaccharide is
(a) $C_{12}H_{22}O_{11}$ (b) $C_{10}H_{18}O_8$
(c) $C_{10}H_{20}O_{10}$ (d) $C_{18}H_{22}O_{11}$.

90. Toluene can be oxidised to benzoic acid by
(a) H_2SO_4 (b) $KMnO_4$
(c) $K_2Cr_2O_7$ (d) both (b) and (c).

91. Sodium metal crystallises as a body centred cubic lattice with the cell edge 4.29 Å. What is the radius of sodium atom (in cm)?
(a) 9.312×10^{-7} (b) 1.857×10^{-8}
(c) 2.371×10^{-7} (d) 3.817×10^{-8}.

92. Beilstein test is used for the detection of
(a) Cl (b) Na
(c) N_2 (d) CO_2.

93. Which of the following atoms would be paramagnetic?
(a) Zn (b) Be
(c) Ca (d) N.

94. The weight of a molecule of the compound $C_{60}H_{122}$ is
(a) 5.025×10^{23} g (b) 16.023×10^{23} g
(c) 1.4×10^{-21} g (d) 1.09×10^{-21} g.

95. Which of the following is the correct statement for PH_3?
(a) it is less poisonous than NH_3
(b) it is less basic than NH_3
(c) electronegativity of PH_3 is $>NH_3$
(d) it does not show reducing properties.

96. $CuSO_4$ reacts with KCN solution and forms
(a) $K_3[Cu(CN)_4]$ (b) $Cu(CN)$
(c) $Cu(CN)_2$ (d) $K_4[Cu(CN)_6]$.

97. Density ratio of O_2 and H_2 is 16 : 1. The ratio of their r.m.s velocities will be
(a) 1 : 4 (b) 1 : 16
(c) 4 : 1 (d) 16 : 1.

98. Which of the following equation does not obey the law of conservation of mass?
(a) $4H + O_2 \rightarrow 2H_2O$ (b) $H_2 + O \rightarrow 2H_2O$
(c) $2H + O_2 \rightarrow H_2O$ (d) both (b) and (c).

99. If benzene reacts with Cl_2 in presence of ultraviolet light then which of the following is formed?
(a) CCl_4 (b) C_6Cl_6
(c) C_6H_5Cl (d) $C_6H_6Cl_6$.

100. Which of the following is the strongest acid?
(a) HClO (b) $HClO_3$
(c) $HClO_2$ (d) $HClO_4$.

101. Benzaldehyde can be prepared by the hydrolysis of
(a) benzyl chloride
(b) benzotrichloride
(c) banzal chloride (d) benzo nitrite.

102. Which of the following metal is present in brass, bronze and german-silver?
(a) Cu (b) Na
(c) Mg (d) Al.

103. The propene reacts with HBr to form
(a) hexane (b) bromopropane
(c) propane (d) ethane.

104. The correct order of the increasing ionic character is
(a) $BeCl_2 < MgCl_2 < BaCl_2 < CaCl_2$
(b) $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$
(c) $BeCl_2 < BaCl_2 < MgCl_2 < CaCl_2$
(d) $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$.

105. The meta-directing group in the following is
(a) OH (b) NH_2.
(c) CH_3 (d) NO_2.

106. Internal energy does not include
(a) rotational energy (b) vibrational energy
(c) nuclear energy
(d) energy gravitational pull.

107. The specific heat of a metal is 0.16. Its approximate atomic weight would be
(a) 40 (b) 16
(c) 32 (d) 64.

108. The vapour pressure of benzene at a certain temperature is 640 mm of Hg. A non-volatile and non-electrolyte solid weighing 2.175 g is added to 39.08 g of benzene. The vapour pressure of the solution is 600 mm of Hg. What is the molecular weight of solid substance?
(a) 69.60 (b) 49.59
(c) 59.60 (d) 108.30.

109. Which among the following has the largest dipole moment?
(a) HI (b) H_2O
(c) NH_3 (d) SO_3.

110. Oxidation state of osmium (Os) in OsO_4 is
(a) +4 (b) +6
(c) +7 (d) +8.

Directions. Q. 111 to 120 : *These questions consist of two statements each, printed as Assertion (A) and Reason (R). While answering these questions you are required to choose any one of the following four responses.*
(a) If both A and R are true, and R is a correct explanation of the A.
(b) If both A and R are true, but R is not a correct explanation of the A.
(c) If A is true, but R is false.
(d) If both A and R are false.

111. *Assertion:* Xenon forms fluorides.
Reason: Because 5d-orbitals are available for valence shell expansion.

112. *Assertion:* Identification of cathode and anode is done by the use of a thermometer.
Reason: Higher is the value of reduction potential, greater would be its reducing power.

113. *Assertion:* Zinc displaces copper from copper sulphate solution.
Reason: The E°_{298} of Zn is -0.76 volts and that of Cu is +0.34 volts.

114. *Assertion:* Reaction of conc. H_2SO_4 on NaBr and NaI does not give HBr and HI.
Reason: HBr and HI are oxidised by conc. H_2SO_4 to Br_2 and I_2.

115. *Assertion:* Taillag of mercury occurs on passing ozone through it.
Reason: Due to oxidation of mercury.

116. *Assertion:* Bond order can assume any value number including zero.
Reason: Higher the bond order, shorter is bond length and greater is bond energy.

117. *Assertion:* The dipole moment helps to predict whether a molecule is polar or nonpolar.
Reason: The dipole moment helps to predict geometry of molecules.

118. *Assertion:* Lower aldehydes and ketones are soluble in water but the solubility decreases as the molecular masses increase.
Reason: Distinction between aldehydes and ketones can be made by Tollen's test.

119. *Assertion:* The term tautomerism was introduced by Maxwell in order to explain the chemical reactivity of a substance according to two possible structures
Reason: Metamers can also be chain isomers or position isomers.

120. *Assertion:* Equivalent conductance of all electrolytes decreases with increasing concentration.
Reason: Lesser number of ions are available per g equivalent at higher concentration.

BIOLOGY

121. Which of the following chambers of the heart has the thickest muscular wall?
(a) left atrium (b) right atrium
(c) right ventricle (d) left ventricle.

122. Which gland plays a key role in metamorphosis of frog's tadpole?
(a) thymus (b) thyroid
(c) pancreas (d) adrenal.

123. Weberian ossicles are found in
(a) fishes (b) frogs
(c) snakes (d) birds.

124. Inflammatory response, in allergy, is caused by the release of
(a) histamines (b) antigen
(c) antibodies (d) prothrombin.

125. XO-chromosomal abnormality in human beings causes
(a) Turner's syndrome
(b) Down's syndrome
(c) Klinefelter's syndrome
(d) none of these.

126. If a person is injured, he should be given blood. Which of the following blood groups should be given without checking the patient's own blood group?
(a) B (b) A
(c) AB (d) O.

127. Which of the following hormones is a derivative of amino acid?
(a) prostaglandin (b) progesterone
(c) epinephrine (d) estrogen.

128. Liver in our body stores
(a) vitamin D (b) vitamin A
(c) vitamin B_{12} (d) all of these.

129. Cumulus covers
(a) ovum (b) ovary
(c) embryo (d) all of these.

130. The function of renin is
(a) stimulation of corpus luteum
(b) vasodilation
(c) to reduce blood pressure
(d) degradation of angiotensinogen.

131. Which of the following is the example of conditioned reflex?
(a) hand withdraws when piered with a needle
(b) eyes closed, when anything enter into it
(c) during digestion food goes forward in alimentary canal
(d) trained dog salivates when you ring a bell.

132. The heartbeat increases at the time of interview due to
(a) secretion of adrenaline
(b) corticotrophic hormone
(c) hyper secretion of renin
(d) autidiuretic hormone secretion.

133. The component of blood which prevents its coagulation in the blood vessels is
(a) haemoglobin (b) plasma
(c) thrombin (d) heparin.

134. Conn's disease is caused by the over-secretion of
(a) aldosterone (b) ADH
(c) ACTH (d) none of these.

135. The extra embryonic membranes of mammalian embryo are derived from
(a) inner cell mass (b) formative cells
(c) trophblast (d) follicle cells.

136. Which one of the following is true during ageing?
(a) increasing in calcium content of arteries and cartilage
(b) decrease in blood urea and GFR
(c) decrease in cholesterol content of cornea and lens
(d) decrease in calcium content of arteries and cartilage.

137. The end-product of ornithine cycle is
(a) carbon dioxide (b) uric acid
(c) urea (d) ammonia.

138. Wings of pigeon, mosquito and bat show
(a) divergent evolution
(b) atavism
(c) convergent evolution
(d) all of these.

139. First step of utilisation of glucose in metabolism is
(a) glycogen (b) ATP
(c) pyruvic acid
(d) glucose-6-phosphate.

140. *Otorhinolaryngology* is the study of
(a) bird's anatomy (b) ENT
(c) brain cells (d) locomotory system.

141. If one strand of DNA has the nitrogenous base sequence ATGCTTGA, the sequence in the complementary strand will be
(a) TAGGTAGT
(b) TACGTACT
(c) TACGAACT (d) TCCGAACT.

142. When a bacteriophage, in its lytic phase, carries some of the bacterium partially digested chromosome with it to another host cell, the process is called
(a) generalised transduction
(b) conjugation
(c) transformation
(d) specialised transduction.

143. Restriction endonucleases are utilised in genetic engineering as
(a) molecular scalpers for cutting DNA at specific sites
(b) molecular builder of nucleotides
(c) molecular degradation to DNA break up
(d) molecular cement for combining DNA bits into long chains.

144. The major component of bacterial cell wall is a polymer called
(a) chitin (b) xylan
(c) cellulose (d) peptidoglycan.

145. Bryophytes are not characterised by
(a) vascular tissues
(b) well-developed root system
(c) alternation of generation
(d) presence of chlorophyll.

146. Hormogonia are the vegetative reproductive structures of
(a) *Oscillatoria*
(b) *Ulothrix*
(c) *Spirogyra*
(d) *Chlamydomonas*.

147. The protein coat of virus is called
(a) capsomeres (b) prions
(c) viriod (d) capsid.

148. The organelle found between cell wall of two cells is called
(a) lomasome (b) lysosome
(c) microsome (d) middle lamella.

149. The *correct* sequence in cell cycle is
(a) $S - M - G_1 - G_2$ (b) $S - G_1 - G_2 - M$
(c) $G_1 - S - G_2 - M$ (d) $M - G_1 - G_2 - S$.

150. Sporogony of malarial parasite occurs in
(a) stomach wall of mosquito
(b) salivary glands of mosquito
(c) RBCs of man
(d) liver of man.

151. In spermatogenesis, the acrosome of sperm is formed by
(a) golgi complex (b) mitochondria
(c) lysosome (d) nucleus.

152. Paired spermathecae occur in *Pheretima* in which of the following segments?
(a) 6, 7, 8, 9 (b) 4, 5, 6, 7
(c) 5, 6, 7, 8 (d) 3, 4, 5, 6.

153. Kidney of adult reptiles are
(a) metanephric (b) mesonephric
(c) protonephric (d) all of these.

154. The familiar disease Amoebiasis is caused by
(a) *Taenia solium*
(b) *Wuchereria bancrofti*
(c) *Entamoeba histolytica*
(d) *Ascaris lumbricoides*.

155. Secondary phloem remains functional generally
(a) less than 1 year
(b) more than 1 year
(c) for 1 year
(d) as long as plant lives.

156. The movement of lamina lobe of Dionaea is
(a) thigmonastic (b) photonastic
(c) seismonastic (d) thermonastic.

157. Casparian strips are the characteristics of
(a) cortex (b) endodermis
(c) pericycle (d) pith.

158. The crystals of calcium carbonate, which appear like a bunch of grapes in epidermal cells of the leaves of some plants, are called
(a) sphaeraphides (b) raphides
(c) otoliths (d) cystoliths.

159. Anemophilous flowers have
(a) small, smooth stigma
(b) coloured flower
(c) sessile stigma
(d) large feathery stigma.

160. The root cell of wheat plant has 42 chromosomes. What would be the number of chromosomes in the synergid cell?
(a) 21 (b) 7
(d) 28 (d) 14.

161. The high energy bonds of ATP are between
(a) C – O (b) O – P
(c) C – N (d) C – C.

162. Which of the following is responsible for the mechanical support, protein synthesis and enzyme transport?
(a) cell membrane
(b) mitochondria
(c) dictyosome
(d) endoplasmic reticulum.

163. The vascular cambium and cork cambium are the examples of
(a) apical meristem
(b) lateral meristem
(c) intercalary meristem
(d) elements of xylem and phloem.

164. Crop rotation is used by farmers to increase
(a) nitrogenous content of soil
(b) organic content of soil
(c) soil fertility
(d) all of these.

165. The food chain, in which micro-organisms breakdown the energy rich compounds synthesises by producers is called
(a) ecosystem
(b) detritus food chain
(c) parasitic food chain
(d) predator food chain.

166. Obligate parasites are those organisms which
(a) live only on living host
(b) are essentially parasites but can also become saprophyte
(c) live only on dead and decaying organic matter
(d) are essentially saprophytes but can also becomes parasites.

167. If a homozygous red-flowered plant is crossed with a homozygous white-flowered plant, the offsprings will be
(a) half-white flowered
(b) half red-flowered
(c) all white-flowered
(d) all red-flowered.

168. Nitrous acid causes mutation by
(a) acting as a base analogue
(b) addition of a base pair
(c) hydrolysing base sugar linkage
(d) removing amino group from the bases.

169. Ficus is an example of which kind of inflorescence?
(a) raceme (b) spike
(c) cyathium (d) hypanthodium.

170. Which of the following reduces plant growth and induces dormancy?
(a) cytokinin (b) auxin
(c) xylene (d) abscisic acid.

Directions. Q. 171 to 180 : *These questions consist of two statements each, printed as Assertion (A) and Reason (R). While answering these questions you are required to choose any one of the following four responses.*
(a) If both A and R are true, and R is a correct explanation of the A.
(b) If both A and R are true, but R is not a correct explanation of the A.
(c) If A is true, but R is false.
(d) If both A and R are false.

171. *Assertion:* If you burn a plant, its nitrogen component is given off as ammonia and other gases.
Reason: Hydroponics does not allow plants to grow well if they are supplied with all the mineral nutrients they need.

172. *Assertion:* Co-enzyme is a non-protein group without which certain enzymes are inactive or incomplete.
Reason: Co-enzymes not only provide a point of attachment of the chemical group being transformed but also influence the properties of the group.

173. *Assertion:* Soil particles, particularly clay and organic matter in soil, contain negative charges that attract positively-charged ions such as Ca^{++}, K^{+} and Mg^{++}.
Reason: This attraction keeps these ions at a soil level where they are available to plants.

174. *Assertion:* Wax, resin and suberin coating on the surface of plant parts reduce the rate of transpiration.
Reason: These adaptations are found mostly in xerophytes.

175. *Assertion:* Light is very important external factor of transpiration.
Reason: Light induces stomatal opening and darkness stomatal closure. Thus the rate of transpiration increased in light and decreases in dark.

176. *Assertion:* Rhizobial aggregates have been observed at distinct sites on curled root hairs.
Reason: The infection thread is formed by a process of invagination of the hair cell walls in the region of curling.

177. *Assertion:* It is the brain, not the sense organs, that interprets the stimulus.
Reason: Sense organs are transducers. They transform the energy of a stimulus to the energy of nerve impulses.

178. *Assertion:* Adenine cannot pair with cytosine.
Reason: Because there would be two hydrogen atoms one at the bonding positions and none at the other.

179. *Asserion:* Cartilage (protein matrix) and bone (calcium matrix) are rigid connective tissues.
Reason: Blood is connective tissue in which plasma is the matrix.

180. *Assertion:* Hair cells on the basilar membrane (organ of corti) are responsible for hearing
Reason: Pressure waves, which begin at the oval windows, cause the basilar membrane to vibrate so that the cilia of the hair cells touch the tectorial membrane. This causes the hair cells to initiate nerve impulses, which are carried by the auditory nerve to the brain.

GENERAL KNOWLEDGE

181. Seoul is the capital of
(a) Japan (b) South Korea
(c) Afganisthan (d) Philippines.

182. The Nobel Prize for physiology and Medicine for the year 1998 was given for the discovery of
(a) invading germs (b) prion
(c) viagra (d) streptomycin.

183. AIDS is caused by
(a) helminth (b) streptomycin
(c) virus (d) bacteria.

184. Hirakund dam is constructed on which of the following rivers?
(a) Ganga (b) Kosi
(c) Sutlej (d) Mahanadi.

185. Which of the following is a cave temple in India?
(a) Ellora (b) Mahabalipuram
(c) Perli (d) Tuljapur.

186. The person who served as the President of India twice, was
(a) Dr. Zakir hussain (b) V.V. Giri
(c) S. Radhakrishnan (d) Dr. Rajendra Prasad.

187. How many countries have adopted the Euro currency?
(a) 7 (b) 6
(c) 9 (d) 11.

188. Which of the following is responsible for the disease 'dropsy'?
(a) *Brassica oleracea*
(b) *Argemone maxicana*
(c) *Brassica compestris*
(d) *Oenothera lamarckiana.*

189. Who won the Filmfare Award for Best Feature Film in 1998?
(a) *Satya*
(b) *Zakhmi*
(c) *Ziddi*
(d) *Kuch Kuch Hota Hai.*

190. Hari Prasad Chaurasia is related to which of the following instruments?
(a) Table (b) Santoor
(c) Flute (d) Violin.

191. Fundamental duties were introduced in the Constitution by the
(a) 40th Amendment (b) 42nd Amendment
(c) 48th Amendment (d) 53rd Amendment.

192. In which country did tea originate?
(a) England (b) India
(c) Thailand (d) China.

193. The great anthology of poems Madhushala was composed by

(a) Mahadevi verma
(b) Mulk Raj Anand
(c) Surendra Sharma
(d) Harvansh Rai Bachchan.

194. Ecology is the branch of science, which deals with
(a) soil's surface
(b) human anatomy
(c) cell structure
(d) balance of nature.

195. Which of the following countries is not a member of SAARC?
(a) Nepal (b) Myanmar
(c) Maldives (d) Bangladesh.

196. Which of the following vitamins is required in bone formation?
(a) B (b) A
(c) C (d) D.

197. The dance of India which contains solo performance is
(a) *Dandia* (b) *Disco*
(c) *Bhangra* (d) *Bharatnatyam.*

198. The Fifth Pay Commission was headed by Justice
(a) Anand (b) Pandian
(c) Ahmad (d) Vadhwa.

199. Which of the following pairs is incorrect?
(a) Abdul Fazal - Author
(b) Kapil - Cricket
(c) Feroz Gandhi - Politics
(d) M.F. Hussain - Actor.

200. Which of the following missiles of India has the longest range?
(a) *Akash* (b) *Pinaka*
(c) *Prithvi* (d) both (a) and (b).

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