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AIIMS BSc Nursing 2011 Question Paper PDF

The All India Institute of Medical Sciences (AIIMS), New Delhi, Nursing programmes includes BSc (Hons.) Nursing and BSc Nursing (Post-Basic)

SOLVED PAPER
AIIMS - 2011*

Time : 3½ Hours | Max. Marks : 200

PHYSICS

1. What is the dimensions of magnetic field B in terms of C (= coulomb), M, L, T?
(a) $[M^1L^1T^{-2}C]$ (b) $[M^1L^0T^{-1}C^{-1}]$
(c) $[M^1L^0T^{-2}C]$ (d) $[M^1L^0T^{-1}C]$

2. What is the mechanical equivalent of spring constant k in LC oscillating circuit?
(a) $\frac{1}{L}$ (b) $\frac{1}{C}$
(c) $\frac{L}{C}$ (d) $\frac{1}{LC}$

3. What is the moment of inertia for a solid sphere w.r.t. a tangent touching to its surface?
(a) $\frac{2}{5}MR^2$ (b) $\frac{7}{5}MR^2$
(c) $\frac{2}{3}MR^2$ (d) $\frac{5}{3}MR^2$

4. Water is flowing with velocity 4 m s^{-1} in a cylinder of diameter 8 cm, it is connected to a pipe with it end tip of diameter 2 cm, calculate the velocity of water at this free end.
(a) 4 m s^{-1} (b) 8 m s^{-1}
(c) 32 m s^{-1} (d) 64 m s^{-1}

5. A cylindrical wire is twisted with an angle θ, what is torsion produced in it?
(a) $\frac{C}{\theta}$ (b) $C\theta$
(c) $\frac{C}{\theta^2}$ (d) $C\theta^{3/2}$

6. Given, $\vec{\omega} = 2\hat{k}$ and $\vec{r} = 2\hat{i} + 2\hat{j}$. Find the linear velocity.
(a) $4\hat{i} + 4\hat{j}$ (b) $4\hat{i} + 4\hat{k}$
(c) $-4\hat{i} + 4\hat{j}$ (d) $-4\hat{i} - 4\hat{j}$

7. If maximum speed of a particle in SHM is given by V_m, what is its average speed?
(a) $\frac{\pi}{2}V_m$ (b) $\frac{2}{\pi}V_m$
(c) $\frac{\pi}{4}V_m$ (d) $\frac{V_m}{\sqrt{2}}$

8. Which of the following equation does not represent a SHM?
(a) $\cos\omega t + \sin\omega t$ (b) $\sin\omega t - \cos\omega t$
(c) $1 - \sin 2\omega t$ (d) $\sin\omega t + \cos(\omega t + \alpha)$

9. In simple harmonic motion, loss of kinetic energy is proportional to
(a) e^x (b) x^3
(c) $\log x$ (d) x^2

10. Emissive and absorptive power of a material at 2000 K is 8 and 10 respectively, calculate the emissivity of IBB (Ideal black body)
(a) 0.2 (b) 0.4
(c) 0.6 (d) 0.8

11. Energy stored in between the plates of parallel plate capacitor of area A, separated by distance d is
(a) $\frac{1}{2}\varepsilon_0 E^2 Ad$ (b) $\frac{1}{2}\varepsilon_0 E^2 \frac{A}{d}$
(c) $\frac{1}{2}\varepsilon_0 \frac{d}{E^2 A}$ (d) $\frac{1}{2}\frac{Ad}{\varepsilon_0 E^2}$

12. Magnetic energy per unit volume is represented by
(a) $\frac{B^2}{2\mu_0}$ (b) $\frac{B^2}{2\mu_0^2}$
(c) $\frac{2B^2}{\mu_0}$ (d) $\frac{B^2}{\mu_0}$

13. Mutual inductance M between two concentric coils of radii 1 m and 2 m is
(a) $\frac{\mu_0\pi}{2}$ (b) $\frac{\mu_0\pi}{4}$

* *Based on memory.* Contributed by : **Allen Career Institute**, Kota (Rajasthan)

(c) $\frac{\mu_0\pi}{8}$ (d) $\frac{\mu_0\pi}{10}$

14. In an interference, the intensity of two interfering waves are I and $4I$ respectively. They produce intensity at two points A and B with phase angle of $\pi/2$ and π respectively. Then difference in between them is
(a) I (b) $2I$
(c) $4I$ (d) $5I$

15. In a single slit diffraction with $\lambda = 500$ nm and a lens of diameter 0.1 mm then width of central maxima, obtain on screen at a distance of 1 m will be
(a) 5 mm (b) 1 mm
(c) 10 mm (d) 2.5 mm

16. Voltage of modulating wave of 5 V with 10 MHz frequency was superimposed on carrier wave of frequency 20 MHz and voltage 20 V then the modulation index is
(a) 0.25 (b) 1.25
(c) 2.43 (d) 64.0

17. The area covered by a transmitting antenna of height 50 m is
(a) 320π km^2 (b) 1440 km^2
(c) 640π km^2 (d) 120π km^2

18. If we assume kinetic energy of a proton is equal to energy of the photon, the ratio of de Broglie wavelength of proton to photon is proportional to
(a) E (b) $E^{-1/2}$
(c) $E^{1/2}$ (d) $E^{3/2}$

19. The ratio of the masses of the elements having their nuclear radii 2 fermi and 1 fermi is
(a) 8 (b) 2
(c) 3 (d) 4

20. A proton travels few distance in an electric field, then it enters a crossed magnetic field of 1 T and radius 0.2 m, find the velocity of proton.
(a) 0.2×10^8 m s^{-1} (b) 0.2×10^7 m s^{-1}
(c) 0.2×10^6 m s^{-1} (d) 2×10^7 m s^{-1}

21. Two lens of focal lengths –20 cm and +10 cm are put in combination, find the power of the combination.
(a) – 1 D (b) – 2 D
(c) + 5 D (d) + 2 D

22. A far sighted person has his near point 50 cm, find the power of lens he should use to see at 25 cm, clearly.
(a) + 1 D (b) + 2 D
(c) – 2 D (d) – 1 D

23. For a nuclear reactor to run in critical condition the reproduction factor k should be
(a) = 1 (b) > 1
(c) < 1 (d) >>> 1

24. Which of the following substances magnetic susceptibility χ_m is negative?
(a) Diamagnetic (b) Paramagnetic
(c) Ferromagnetic (d) All of these

25. When orientation of dipoles parallel and antiparallel to magnetic field is distributed unequally, then the material is
(a) paramagnetic (b) ferromagnetic
(c) ferrimagnetic (d) antiferromagnetic

26. S^{32} absorbs energy and decays into which element after two α-emissions?
(a) Carbon (b) Aluminium
(c) Oxygen (d) Magnesium

27. Lenz law is consistent with conservation of
(a) energy (b) mass
(c) charge (d) momentum

28. In series LCR circuit, the phase difference between applied voltage and current is
(a) positive when $X_L > X_C$
(b) positive when $X_C > X_L$
(c) 90° (d) 0°

29. Direction of electric field in P-N junction diode is
(a) from P-side to N-side
(b) from N-side to P-side
(c) randomly oriented
(d) electric field does not exist

30. What is your observation when two sources are emitting sound with frequency 499 Hz and 501 Hz?
(a) Frequency of 500 Hz is heard with change in intensity take place twice.
(b) Frequency of 500 Hz is heard with change in intensity take place once.
(c) Frequenc y of 2 Hz is heard with change in intensity take place once.
(d) Frequency of 2 Hz is heard with change in intensity take place twice.

31. A 0.2 kg object at rest is subjected to a force $(0.3\hat{i} - 0.4\hat{j})$ N. What is the velocity after 6 s?
(a) $(9\hat{i} - 12\hat{j})$ (b) $(8\hat{i} - 16\hat{j})$
(c) $(12\hat{i} - 9\hat{j})$ (d) $(16\hat{i} - 8\hat{j})$

32. If man were standing unsymmetrically between parallel cliffs, claps his hands and starts hearing a series of echoes at intervals of 1 s. If speed of sound in air is 340 m s^{-1}, the distance between two cliffs would be
(a) 340 m (b) 510 m
(c) 170 m (d) 680 m

33. Half life of a radioactive material is 5 years, then the percentage of it remained after 25 years will be
(a) 3.125% (b) 6.25%
(c) 1.25% (d) 25%

34. For an adiabatic process
(a) $\Delta S = 0$ (b) $\Delta U = 0$
(c) $Q = 0$ (d) $W = 0$

35. For cyclic process which of the following quantity is zero?
(a) ΔV (b) ΔU
(c) W (d) ΔQ

36. Magnetic field at a distance a from long current carrying wire is proportional to
(a) $\frac{1}{a}$ (b) $\frac{1}{a^2}$
(c) $\frac{1}{\sqrt{a}}$ (d) $\frac{1}{a^{3/2}}$

37. When a positively charged particle enters into a uniform magnetic field with uniform velocity, its trajectory can be
(i) a straight line (ii) a circle
(iii) a helix
(a) (i) only (b) (i) or (ii)
(c) (i) or (iii)
(d) any one of (i), (ii) and (iii)

38. Among the following which is used to control the rate of reaction in nuclear fission reactions?
(a) Water (b) Heavy water
(c) Cadmium (d) Graphite

39. The series corresponding to minimum wavelength transition in H-atom
(a) Balmer series (b) Lyman series
(c) Paschen series (d) Brackett series

40. Pressure head in Bernoulli's equation is
(a) $\frac{P\rho}{g}$ (b) $\frac{P}{\rho g}$
(c) ρg (d) $P\rho g$

Directions : In the following questions (41-60), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as :
(a) If both assertion and reason are true and reason is the correct explanation of assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) If assertion is true but reason is false.
(d) If both assertion and reason are false.

41. **Assertion** : Transverse sound wave does not occurs in gases.
Reason : Gases cannot sustain shearing strain.

42. **Assertion** : When white light fall on the compact disc, multicolours are seen after reflection.
Reason : CD disc behaves like a prism.

43. **Assertion** : Total energy is conserved in moving a satellite to higher orbit.
Reason : Sum of change in PE and KE is same in magnitude and opposite in nature.

44. **Assertion** : KE is conserved at every instant of (elastic) collision.
Reason : No deformation of matter occurs in elastic collision.

45. **Assertion** : C_p is always greater than C_V in gases.
Reason : Work done at constant pressure is more than at constant volume.

46. **Assertion** : During rapid pumping of air in tyres, air inside the tyre is hotter than atmospheric air.
Reason : Adiabatic process occurs at very high rate.

47. **Assertion** : For nuclear reactor, it is desirable to have $k = 1$.
Reason : Sustained chain reaction occur at this critical condition.

48. **Assertion** : Gauss's law can't be used to calculate electric field near an electric dipole.
Reason : Electric dipole don't have symmetrical charge distribution.

49. **Assertion** : Photodiode and photovoltaic cell are based on the same principle.
Reason : Both use same method of operations to work.

50. **Assertion** : Transistor can be used as a switch.
Reason : Both linear and non-linear voltage bias dependance occurs in it.

51. **Assertion** : When a white light is passed through a lens, violet light is more refracted than red light.
Reason : Focal length for red light is greater than violet.

52. **Assertion** : Microscope magnifies the image.
Reason : Angular magnification for image is more than object in microscope.

53. **Assertion** : Mass defect in nuclear reactions is less than 1%
Reason : In nuclear reaction, change in *BE/N* is generally less than 1%.

54. **Assertion** : It is very easy to detect neutrino in nature.
Reason : It has high affinity to interact with matter.

55. **Assertion** : In the transmission of long distance radio signals, short wave band is used.
Reason : In shorter wavelength, attenuation is very less.

56. **Assertion** : There is a physical significance of matter waves.
Reason : Both interference and diffraction occurs in it.

57. **Assertion** : It is desirable to slow down fast moving neutrons to sustain controlled chain reactions.
Reason : Slow moving neutrons efficiently collides with U^{235}.

58. **Assertion** : Magnetic field lines are continuous and closed.
Reason : Magnetic monopole does not exist.

59. **Assertion** : Magnification of a convex mirror is always positive, but that of a concave mirror may be both positive or negative.
Reason : It depends on the sign convention chosen.

60. **Assertion** : Magnetic force between two short magnets, when they are co-axial follows inverse square law of distance.
Reason : The magnetic forces between two poles do not follow inverse square law of distance.

CHEMISTRY

61. The compound which does not exist as hydrate form
(a) ferrous sulphate (b) copper sulphate
(c) magnesium sulphate
(d) sodium chloride

62. Iodine oxidises sodium borohydride to give
(a) B_2H_6 (b) sodium hydride
(c) HI (d) I_3^-

63. The wrong statement about fullerene is
(a) it has 5-membered carbon ring
(b) it has 6-membered carbon ring
(c) it has sp^2 hybridization
(d) it has 5-membered rings more than 6-membered rings

64. The wavelength of light absorbed is highest in
(a) $[Co(NH_3)_5Cl]^{2+}$ (b) $[Co(NH_3)_5H_2O]^{3+}$
(c) $[Co(NH_3)_6]^{3+}$ (d) $[Co(en)_3]^{3+}$

65. PCl_3 on hydrolysis gives fumes of
(a) H_3PO_3 + HCl (b) H_3PO_4 + HCl
(c) H_3PO_2 and H_3PO_3 (d) H_3PO_2 + HCl

66. In solid ice, oxygen atom is surrounded
(a) tetrahedrally by 4 hydrogen atoms
(b) octahedrally by 2 oxygen and 4 hydrogen atoms
(c) tetrahedrally by 2 hydrogen and 2 oxygen atoms
(d) octahedrally by 6 hydrogen atoms

67. Predict the product of reaction of I_2 with H_2O_2 in basic medium.

(a) I^- (b) I_2O_3
(c) IO_3^- (d) I_3^-

68. First compound of Xe synthesized was
(a) $[XeF]^+ [XePtF_5]^-$ (b) $[XeO_2]$
(c) $Xe[PtF_6]$ (d) $O_2[XeF_6]$

69. Which of the following is diamagnetic ?
(a) $[Cu(NH_3)_4]^{2+}$ (b) $[NiCl_4]^{2-}$
(c) $[PtCl_4]^{2-}$ (d) $[Cu(H_2O)_4]^{2+}$

70. Which of the following is not hygroscopic?
(a) CsCl (b) $MgCl_2$
(c) $CaCl_2$ (d) LiCl

71. Decreasing order of bond angle is
(a) $BeCl_2 > NO_2 > SO_2$ (b) $BeCl_2 > SO_2 > NO_2$
(c) $SO_2 > BeCl_2 > NO_2$ (d) $SO_2 > NO_2 > BeCl_2$

72. The enthalpy of formation of $CO_{(g)}$, $CO_{2(g)}$, $N_2O_{(g)}$ and $N_2O_{4(g)}$ is –110, –393, +811 and 10 kJ/mol respectively. For the reaction, $N_2O_{4(g)} + 3CO_{(g)} \rightarrow N_2O_{(g)} + 3CO_{2(g)}$. ΔH_r (kJ/mol) is
(a) –212 (b) +212
(c) +48 (d) – 48

73. When $KMnO_4$ reacts with KBr in alkaline medium gives bromate ion. Then oxidation state of Mn changes from +7 to
(a) +6 (b) +4
(c) +3 (d) +2

74. How much amount of $CuSO_4 \cdot 5H_2O$ is required for liberation of 2.54 g of I_2 when titrated with KI?
(a) 2.5 g (b) 4.99 g
(c) 2.4 g (d) 1.2 g

75. Which of the following is incorrect for physisorption?
(a) Reversible
(b) Increases with increase in temperature.
(c) Low heat of adsorption.
(d) Increases with increase in surface area.

76. Smallest wavelength occurs for
(a) Lyman series (b) Balmer series
(c) Paschen series (d) Brackett series

77. K_{sp} of $CaSO_4 \cdot 5H_2O$ is 9×10^{-6}, find the volume for 1 g of $CaSO_4$ (M.wt. = 136).
(a) 2.45 litre (b) 5.1 litre
(c) 4.52 litre (d) 3.2 litre

78. Which of the following is not a characteristic of equilibrium?
(a) Rate is equal in both directions.
(b) Measurable quantities are constant at equilibrium.
(c) Equilibrium occurs in reversible condition.
(d) Equilibrium occurs only in open vessel at constant temperature.

79. Which of the following is wrong for Bohr model?
(a) It establishes stability of atom.
(b) It is inconsistent with Heisenberg uncertainty principle.
(c) It explains the concept of spectral lines for hydrogen like species.
(d) Electrons behave as particle and wave.

80. In the van der Waals equation, 'a' signifies
(a) intermolecular attraction
(b) intramolecular attraction
(c) attraction between molecules and wall of container
(d) volume of molecules

81. For adiabatic process, which is correct?
(a) $\Delta T = 0$ (b) $\Delta S = 0$
(c) $q = 0$ (d) $q_p = 0$

82. 25 mL, 0.2 M $Ca(OH)_2$ is neutralised by 10 mL of 1 M HCl. Then pH of resulting solution is
(a) 1.37 (b) 9
(c) 12 (d) 7

83. Schottky defect is
(a) vacancy of ions
(b) delocalization of ions
(c) interstitial vacancy of ions
(d) vacancy of only cations

84. Which material is used as a neutron moderator?
(a) Graphite (b) Cadmium
(c) Boron (d) Uranium

85. Which of the following is not a thermodynamic function?
(a) Internal energy (b) Work done
(c) Enthalpy (d) Entropy

86. Which of the following is intensive property?
(a) Enthalpy (b) Entropy
(c) Specific heat (d) Volume

87. For a first order gas phase reaction–
$$A_{(s)} \rightarrow 2B_{(s)} + C_{(s)}$$
P_0 be initial pressure of A and P_t the total pressure at time 't'. Integrated rate equation is

(a) $\frac{2.303}{t}\log\left(\frac{P_0}{P_0 - P_t}\right)$

(b) $\frac{2.303}{t}\log\left(\frac{2P_0}{3P_0 - P_t}\right)$

(c) $\frac{2.303}{t}\log\left(\frac{P_0}{2P_0 - P_t}\right)$

(d) $\frac{2.303}{t}\log\left(\frac{2P_0}{2P_0 - P_t}\right)$

88. Decreasing order of nucleophilicity is

(a) $OH^- > NH_2^- > CH_3O^- > RNH_2$

(b) $NH_2^- > OH^- > CH_3O^- > RNH_2$

(c) $NH_2^- > CH_3O^- > OH^- > RNH_2$

(d) $CH_3O^- > NH_2^- > OH^- > RNH_2$

89. Find the number of stereoisomers of 1,2-dihydroxy cyclopentane.

(a) 1 (b) 2

(c) 3 (d) 4

90. Find the hydrolysis product when a phosphodiester bond of nucleotide breaks.

(a) 3-OH-deoxyribose-5-PO_4^{3-}

(b) 5-OH-deoxyribose-3-PO_4^{3-}

(c) 2-OH-deoxyribose-2-PO_4^{3-}

(d) 4-OH-deoxyribose-2-PO_4^{3-}

91. Find the hydrolysis product of maltose.

(a) α-D-glucose + α-D-glucose

(b) α-D-glucose + α-D-fructose

(c) α-D-glucose + α-D-galactose

(d) α-D-fructose + α-D-galactose

92. Isoprene is

(a) 3-methyl-1,2-butadiene

(b) 2-methyl-1,3-butadiene

(c) 3-chloro-1,2-butadiene

(d) 2-chloro-1,3-butadiene

93. Find the product for
$CH_3CH_2–O–CH_2–CH_2–O–CH_2–C_6H_5 + HI$ (excess)

(a) $HO–CH_2CH_2OH$, $C_6H_5CH_2–I$, $CH_3CH_2–I$

(b) $C_6H_5CH_2–OH$, $CH_3CH_2–I$, $I–CH_2CH_2–OH$

(c) $I–CH_2CH_2–I$, $C_6H_5CH_2–I$, $CH_3CH_2–OH$

(d) $HO–CH_2CH_2–OH$, $C_6H_5CH_2–I$, $CH_3CH_2–OH$

94. Best method to form aromatic iodide is

(a) $ArN_2^+ + HI \longrightarrow$ (b) $RNH_2 + I_2 \longrightarrow$

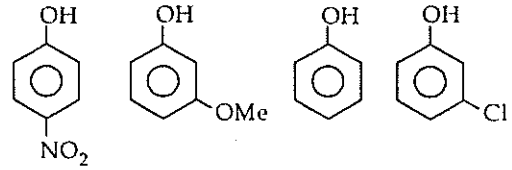
(c) $ArN_2^+ + KI \longrightarrow$ (d) $ArN_2^+ + PI_3 \longrightarrow$

95. Maximum decarboxylation occurs in

(a) CH_3COOH (b) C_6H_5COOH

(c) $C_6H_5CH_2COOH$ (d) CH_3COCH_2COOH

96. The correct increasing order of reactivity for the following molecules towards electrophilic aromatic substitution is

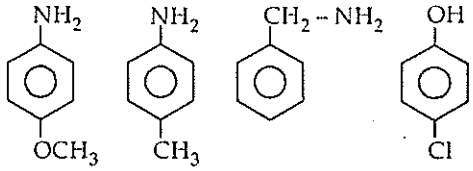


(I) (II) (III) (IV)

(a) I < IV < II < III (b) I < IV < III < II

(c) I < III < II < IV (d) I < III < IV < II

97.



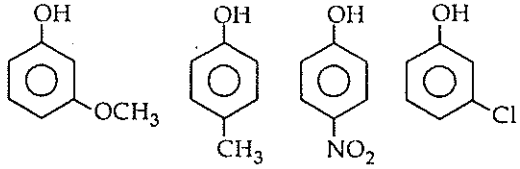
(I) (II) (III) (IV)

The correct decreasing order of pK_b is

(a) I > II > III > IV (b) III > IV > II > I

(c) II > III > IV > I (d) IV > II > I > III

98. The correct decreasing order of pK_a is



(I) (II) (III) (IV)

(a) II > IV > I > III (b) IV > II > III > I

(c) III > II > IV > I (d) IV > I > II > III

99. S_N2 reaction readily occurs in

(a) $CH_3CH_2 - O - CH_3$

(b) $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - O - CH_3$

(c) $CH_2=CH-CH_2-O-CH_3$
(d) $Ph-CH_2-O-CH_2-CH_3$

100. The number of σ- and π-bonds present in pent-4-ene-1-yne is
(a) 10, 3 (b) 4, 9
(c) 3, 10 (d) 9, 4

Directions : In the following questions (101-120), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as :
(a) If both assertion and reason are true and reason is the correct explanation of assertion
(b) If both assertion and reason are true but reason is not the correct explanation of assertion
(c) If assertion is true but reason is false
(d) If both assertion and reason are false.

101. **Assertion** : H_2S is less acidic than H_2Te.
Reason : Te has larger radius than S.

102. **Assertion** : $R_3P=O$ exists but $R_3N=O$ does not exist.
Reason : P is more electronegative than N.

103. **Assertion** : AgCl is more soluble in NH_3 than in water.
Reason : Ammonia is more polar than water.

104. **Assertion** : BCC and HCP has same packing efficiency.
Reason : Both have same number of atoms per unit cell and same arrangement.

105. **Assertion** : Reduction potential of Mn (+3 to +2) is more positive than Fe (+3 to +2).
Reason : Ionisation potential of Mn is more than that of Fe.

106. **Assertion** : Helium is used in diving apparatus.
Reason : Solubility of helium is less in blood.

107. **Assertion** : A reaction is spontaneous if E_{cell} = +ve.
Reason : For E_{cell} = +ve, ΔG is always –ve.

108. **Assertion** : Sulphur is oxidised by H_2O_2 in presence of Fe (III).
Reason : Fe (III) oxidises sulphur to sulphate.

109. **Assertion** : Chlorine undergoes disproportionation reaction in alkaline medium.
Reason : Cl_2 is an oxidising agent.

110. **Assertion** : Entropy is always constant for a closed system.
Reason : Closed system is always reversible.

111. **Assertion** : Two different reactions can never have same rate of reaction.
Reason : Rate of reaction always depends only on frequency of collision and Arrhenius factor.

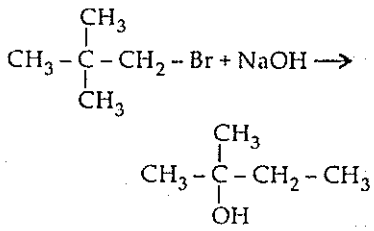
112. **Assertion** : The formal oxidation no. of sulphur in $Na_2S_4O_6$ is 2.5.
Reason : Two S-atoms are not directly linked with O-atoms.

113. **Assertion** : A non volatile solute is mixed in a solution then elevation in boiling point and depression in freezing point both are 2 K.
Reason : Elevation in boiling point and depression in freezing point both depend on melting point of non-volatile solute.

114. **Assertion** : Rate of reaction of alkyl halide in Williamson's synthesis reaction is $1°RX > 2°RX > 3°RX$.
Reason : It is a type of bimolecular substitution reaction (S_N2).

115. **Assertion** : Dehydration of alcohols always takes place in basic medium.
Reason : OH^- is a better leaving group.

116. **Assertion** : Toluene in presence of UV rays forms benzaldehyde.
Reason : Dichlorotoluene is formed as an intermediate.

117. **Assertion** : 
Reason : It follows with formation of more stable carbocation.

118. **Assertion** : β- pleated sheet structure of protein shows maximum extension.

Reason : Intermolecular hydrogen bonding is present in them.

119. Assertion : Fructose is a reducing sugar.
Reason : It has a ketonic group.

120. Assertion : *p*-Nitrophenol gives more electrophilic substituted compound than *m*-methoxyphenol.
Reason : Methoxy group shows only negative *I*-effect.

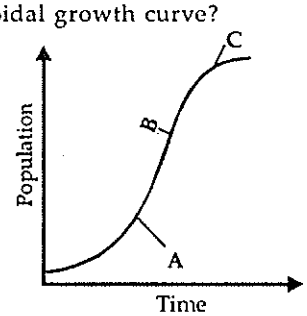
BIOLOGY

121. What is the source of *Eco* R I?
(a) *Escherichia coli* R I
(b) *Escherichia coli* R I 13
(c) *Escherichia coli* R Y 13
(d) *Escherichia coli* R X 13

122. First clinical gene therapy was given in 1992 to a 4 years old girl for
(a) adenine deficiency
(b) growth deficiency
(c) adenosine deaminase deficiency
(d) adenosine deficiency

123. Bacteria, fungi, lower plants survive in adverse conditions by
(a) diapause (b) suspended growth
(c) migration
(d) formation of thick walled spores

124. What are labelled phases A, B and C in given sigmoidal growth curve?



	A	B	C
(a)	Stationary	Log	Lag
(b)	Lag	Stationary	Log
(c)	Log	Lag	Stationary
(d)	Lag	Log	Stationary

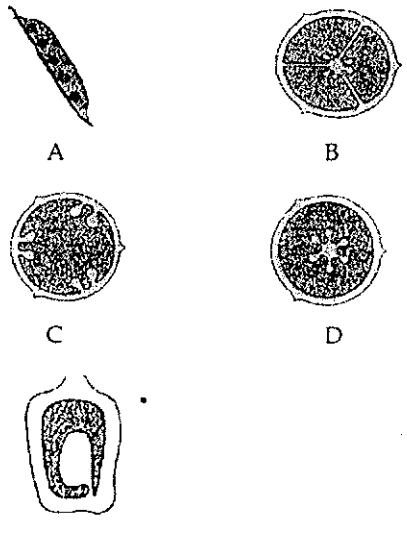
125. Monarch butterfly escapes from predators by
(a) foul smell (b) bitter taste
(c) colour combination
(d) rough skin

126. What is the characteristic of tapetum ?
(a) It does not store food
(b) It is multi-nucleated
(c) It is multi-layered structure
(d) It nourishes the megaspore

127. In vehicles, catalytic converters are used
(a) to increase mileage of vehicles
(b) to convert CO_2 into carbonates
(c) to increase the efficiency of lead mixed petrol
(d) to convert CO to CO_2.

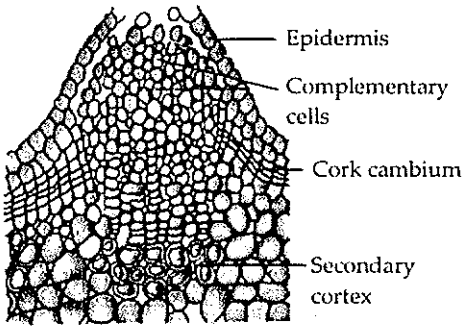
128. Cell theory was proposed by
(a) a botanist
(b) a zoologist
(c) a botanist and a zoologist
(d) a psychologist

129. Identify the given figures A, B, C, D and E.



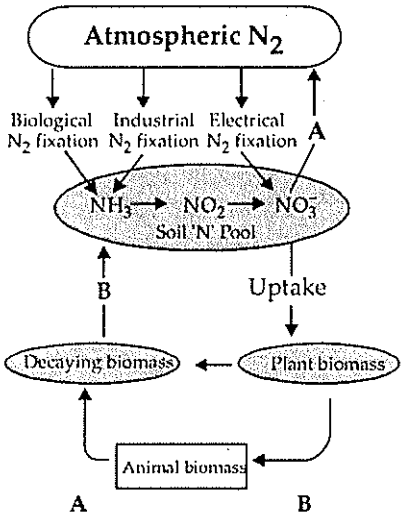
	A	B	C	D	E
(a)	Marginal	Axile	Free central	Parietal	Basal
(b)	Marginal	Parietal	Free central	Axile	Basal
(c)	Marginal	Axile	Parietal	Free central	Basal
(d)	Marginal	Axile	Parietal	Basal	Free central

130. Given figure shows



(a) structure of lenticel
(b) hydathode showing gaseous vapour exchange
(c) fungus reproducing by spore formation
(d) algae reproducing by spore formation.

131. In the given diagram A and B represent



(a) Mineralisation Demineralisation
(b) Ammonification Denitrification
(c) Denitrification Ammonification
(d) Denitrification Mineralisation

132. In active transport, carrier proteins are used, which use energy in the form of ATP, to
(a) transport molecules against concentration gradient of cell wall.
(b) transport molecules along concentration gradient of cell membrane.
(c) transport molecules against concentration gradient of cell membrane.
(d) transport molecules along concentration gradient of cell wall.

133. In a 50 gm living tissue, what would be the amount of water?
(a) 15 - 25 gm (b) 25 - 30 gm
(c) 35 - 45 gm (d) 70 - 90 gm

134. PS-II occurs only in
(a) stroma (b) granal thylakoids
(c) stromal lamella (d) matrix

135. After glycolysis, fate of glucose in mitochondrial matrix is
(a) oxidation (b) reduction
(c) oxidative decarboxylation
(d) hydrolysis

136. Cleistogamy is leading over anthesis because
(a) pollination agent is not required
(b) it assures heterozygosity
(c) it favours insect pollination
(d) it allows xenogamy.

137. Which of the following statements is correct?
(a) Photorespiration is useful process.
(b) C_4 plants are more efficient than C_3 plants.
(c) C_3 plants are more efficient than C_4 plants.
(d) Photorespiration is absent in C_3 plants but present in C_4 plants.

138. Which of the following statements is incorrect regarding fermentation ?
(a) *Propionibacterium* is used to ferment the cheese.
(b) The puffed-up appearance of dough is due to the production of CO_2 gas.
(c) Fermentation in muscle produces ethanol.
(d) Toddy is made by fermenting sap from palms.

139. Which of the following statements is correct ?
(a) *Aspergillus niger* is used for producing cyclosporin A.
(b) Activated sludge is digested by aerobic bacteria to produce marsh gas.
(c) Fleming, Chain & Florey were awarded with Nobel Prize for discovering penicillin.
(d) BOD is amount of oxygen produced by bacteria on decomposition.

140. Which of the following elements is present in very less quantity in the body ?
(a) K (b) Ca
(c) Mg (d) Cu

141. Which of the following is best method of germplasm conservation ?
(a) herbarium (b) botanical garden
(c) seed bank (d) zoological park

142. Which one of the following options is a correct match of phenomenon and its explanation ?
(a) Reverse Transcription PCR – Many copies of a DNA sequence.
(b) Central dogma – RNA → DNA → Protein → RNA.
(c) RNA silencing – Use of ds-RNA to stop the expression of ss-RNA.
(d) Transcription – Process of formation of RNA & proteins.

143. Which of the following is not a characteristic of meiosis?
(a) It involves two stages of DNA replication one before meiosis-I and another before meiosis-II
(b) It involves recombination and crossing over
(c) Sister chromatids separate during anaphase-II
(d) Nuclear membrane disappears during prophase.

144. Which of the following is correct ?
(a) Henking discovered the small Y-chromosome
(b) *Drosophila* also shows XX-XY sex determination like human
(c) Birds have ZZ-ZW sex determination, where females are ZZ & males are ZW
(d) Grasshoppers show XX-XY sex determination.

145. Which statement is correct regarding mosses ?
(a) They have dominant and independent sporophyte.
(b) Their antherozoids require water for fertilization.
(c) Their archegonia produce many eggs.
(d) Their antherozoids are multiflagellated.

146. Which of the following statements is correct ?
(a) Catalytic converter can separate particulate matter of diameter less than 2.5 micrometers.
(b) Histones are acidic in nature that forms core for DNA packaging.
(c) *Lactobacillus* is not present in dough used in idli formation.
(d) Template with polarity 5′ → 3′ has continuous DNA replication.

147. Which of the following statements is correct ?
1. Common cold – Droplet Infection.
2. Typhoid – Contaminated food & water.
3. AIDS – Shaking hands.
4. Ringworm – Using infected towels.
(a) 1 and 2 (b) 3 and 4
(c) 1 and 3 (d) 1,2 and 4

148. Which of the following statements is correct ?
(a) Lion and leopard show convergent evolution.
(b) Cryptic camouflage is seen in *Biston betularia*.
(c) Natural selection is responsible for extinction of dinosaurs.
(d) *Homo habilis* and *Homo erectus* are closely related.

149. Tendon and ligament are example of
(a) dense regular connective tissue
(b) dense irregular connective tissue
(c) loose connective tissue
(d) specialised connective tissue

150. Kingdom Animalia is characterised by
(a) direct dependence on autotrophs
(b) indirect dependence on autotrophs
(c) absence of chlorophyll
(d) absence of cell wall.

151. If medulla oblongata is destroyed then which of the following functions will be effected ?
(a) No thermoregulation
(b) No vision
(c) No memory
(d) No response when pricked with needle

152. Which of the following statements is correct?
(a) Monkey, apes and humans exhibit estrous cycle.
(b) Urine is pale yellow and slightly alkaline.
(c) Lots of enzymes are present in bile juice.
(d) Ovulation in humans is spontaneous.

153. Which of the following evidences does not favour the Lamarckian concept of inheritance of acquired characters?
(a) absence of limbs in snakes
(b) melanization in peppered moth
(c) presence of webbed toes in aquatic birds
(d) lack of pigment in cave-dwelling animals

154. Which of the following is a correct match?
(a) Frog – External ears
(b) Earthworm – Muscular gizzard, typhlosole.
(c) Human – Fat globule, 10 pairs of cranial nerves.
(d) Cockroach – Chilopoda

155. Which of the following is an incorrect statement?
(a) Blood group 'O' person have A and B antigens on RBCs.
(b) Eosinophils resist infections and are associated with allergic infection.
(c) RBC's contain carbonic anhydrase.
(d) T wave of normal ECG represent of depolarization of ventricle.

156. Which one of the following is correct regarding the excretion ?
(a) Large amount of water from renal filtrate is reabsorbed in DCT and a less amount is reabsorbed by PCT
(b) The descending limb of loop of Henle is completely impermeable to salts.
(c) Malpighian corpuscle is found in medulla region of kidney.
(d) The colour of urine is pale yellow and is slightly alkaline in nature.

157. In assisted reproductive technology where gametes have been fertilized *in vitro*, which of the following is practicable for embryo transplantation in Fallopian tube?
(a) only embryo up to 8 blastomeres if zygote is not transplanted.
(b) only zygote is transplanted not embryo
(c) either embryo or zygote with 8 blastomere phase transplanted.
(d) morulla with 8-24 celled stage is transplanted in Fallopian tube.

158. Which of the following features can be said to be a true defining feature of living beings without any exception ?
(a) they can digest their food.
(b) all of them can reproduce.
(c) they can regenerate.
(d) they can respond to external stimuli

159. The opening between the right atrium and the right ventricle is guarded by the valve named
(a) bicuspid valve (b) tricuspid valve
(c) mitral valve (d) semilunar valve

160. Skeletal muscles appear striated due to presence of two characteristic proteins in alternating dark and light bands. Which of the following is a correct match of the protein with its light refractive property and colour?

	Protein	Colour	Property
(a)	Myosin	Light	Anisotropic
(b)	Actin	Dark	Anisotropic
(c)	Myosin	Dark	Isotropic
(d)	Actin	Light	Isotropic

Directions : In the following questions (161-180), a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as :
(a) If both assertion and reason are true and reason is the correct explanation of assertion
(b) If both assertion and reason are true but reason is not the correct explanation of assertion
(c) If assertion is true but reason is false
(d) If both assertion and reason are false.

161. **Assertion** : Enzymes lower down the activation energy of the reactant molecule to make its transition into product easier.
Reason : Enzymes are highly substrate specific catalysts.

162. **Assertion** : Water that enters into a plant cell through diffusion makes it turgid.
Reason : Entry of water into the cell through diffusion develops wall pressure inside the cell.

163. **Assertion** : Movement of materials inside phloem is bidirectional *i.e.* it can be both upwards or downwards.
Reason : Movement of molecules inside xylem is unidirectional *i.e.* always upwards.

164. **Assertion** : Protons or hydrogen ions produced by photolysis of water accumulate in the lumen of thylakoids.
Reason : Photolysis of water takes place in inner membrane of thylakoid.

165. **Assertion** : Plant growth as a whole is indefinite.
Reason : Plants retain the capacity of continuous growth throughout their life.

166. **Assertion** : Amount of organic biodegradable compounds present in water is measured by the BOD of that water.
Reason : During biodegradation of biodegradable organic compounds, oxygen is released by bacteria.

167. **Assertion** : In angiosperms, transport of food and water is more efficient than gymnosperms and pteridophytes.
Reason : In angiosperms longitudinally arranged sieve elements and vessels with perforated end walls are present.

168. **Assertion** : In some species of asteraceae and poaceae seeds are formed without fertilization.
Reason : Formation of fruit without fertilization is called parthenocarpy.

169. **Assertion** : Algal blooms are formed in nutrient-less water.
Reason : Algal blooms in water turn it unfit for human consumption, but cause enormous growth of fish.

170. **Assertion** : A mangrove tree growing in marshy place has pneumatophores.
Reason : Pneumatophores help in better anchorage to marshy soil.

171. **Assertion** : A geneticist crossed two plants, he got 50% tall and 50% dwarf progenies.
Reason : It follows Mendelian law as one of the parent plant might be heterozygous.

172. **Assertion** : Now-a-days amniocentesis is banned.
Reason : Amniocentesis gives the information of any abnormality in the foetus and many other complications regarding pregnancy can be detected.

173. **Assertion** : A gene from *Bacillus thuringiensis* is incorporated in plant genome to increase their yield.
Reason : *Bacillus thuringiensis* has Bt toxin producing gene, which kills the larva of insects.

174. **Assertion** : Glycerides are important nutrients for body.
Reason : Glycerides are hydrolysed into glycerol and fatty acids which are further absorbed in intestine by the formation of chylomicron.

175. **Assertion** : Blood in cockroach is colourless haemolymph with no respiratory pigment.
Reason : Respiration in cockroach occurs through diffusion in haemolymph.

176. **Assertion** : Blood group 'O' have anti-A & anti-B antibodies.
Reason : It does not have any antigens.

177. **Assertion** : S.A. node induces excitatory impulses in heart.
Reason : S.A. node is self excitatory.

178. **Assertion** : Organ of Corti rests on tectorial membrane.
Reason : It helps to maintain equilibrium of body.

179. **Assertion** : Corpus luteum is produced by Graafian follicle after ovulation.
Reason : It secretes estrogen which is necessary to maintain pregnancy.

180. **Assertion** : Sporozoites of malarial parasite enter in the human body due to biting of freshly born female *Anopheles* mosquito, whose mother was a carrier of malarial parasite.
Reason : Male and female gametocytes of malarial parasites are formed in the human intestine.

GENERAL KNOWLEDGE

181. Which river derives its name from Sanskrit word "Lavanavari"?
(a) Luni (b) Kosi
(c) Sabarmati (d) Kaveri

182. Which river's name means "containing reed"?
(a) Gangad (b) Betwa
(c) Narmada (d) Luni

183. First Indian woman grandmaster in chess is
(a) Saheli Dhar
(b) Bhagyashree Thipse

(c) Vijaylakshmi Pandit
(d) Amrit Kaur

184. Two letters printed on first postal stamp of India are
(a) Jai hind (b) Jai kisan
(c) Jai bharat (d) Vande matram

185. Which of the following is called 'Floating sanctuary of India'?
(a) Keibul Lamjao (b) Manas
(c) Kaziranga (d) Bharatpur

186. "India wins freedom" this book was written by
(a) Jawahar Lal Nehru (b) Maulana Azad
(c) Sardar Patel (d) Rajendra Prasad

187. Which fruit is often called "love apple" ?
(a) Pineapple (b) Orange
(c) Tomato (d) Papaya

188. Which country was first to adopt family planning programme?
(a) India (b) China
(c) USA (d) Indonesia

189. After whom the atomic energy programme is commissioned in India?
(a) S.N. Bose (b) C.V. Raman
(c) H.G. Khurana (d) H.J. Bhabha

190. After the death of which prime minister did Guljarilal Nanda joined as acting PM for second time?
(a) Indira Gandhi
(b) Jawahar Lal Nehru
(c) Lal Bahadur Shastri
(d) Charan Singh

191. Whom did Jawahar Lal Nehru called father of Indian revolution?
(a) Bal Gangadhar Tilak
(b) Vipin Chandra Pal
(c) Dhondo Keshave Karve
(d) Maulana Abdul Kalam Azad

192. Among these, who had been the last governor general of India?
(a) Dr. Radhakrishnan
(b) R. Gopalachari
(c) Sardar Patel
(d) Dr. Bhim Rao Ambedkar

193. With which of the following religions, "Karamappa" is related?
(a) Jainism (b) Buddhism
(c) Hinduism (d) Christinism

194. Which of the following authors is not born in India?
(a) Rudyard Kipling (b) Ruskin Bond
(c) Gorge Orwell (d) V.S. Naipal

195. Which of the following actress won the best actress award 3 times consecutively?
(a) Rekha (b) Jaya Bachchan
(c) Smita Patil (d) Shabana Azmi

196. Which woman won the Sahitya Kala Academy award first time?
(a) Amrita Pritam (b) Sarojini Naidu
(c) Kamla Mehta (d) Geeta Das

197. To which gharana " Kishori Amonkar "' belongs to ?
(a) Kirana (b) Jaipur-Attrivi
(c) Lucknow (d) Gwalior

198. Who is the author of the book "Siddhant Shiromani"?
(a) Bhaskaracharya - II
(b) Bhaskaracharya - I
(c) Aryabhatt (d) Ramanujan

199. Which of the following has introduced transcendental meditation?
(a) Rajneesh Osho
(b) Swami Chinmiyanand
(c) Vivekanand
(d) Maharishi Mahesh Yogi

200. Which of the following animal's body secretion is oily red, commonly known as "Sweat blood"?
(a) Rhinoceros (b) Hippopotamus
(c) Cow (d) Tiger