All India Aakash Test Series for NEET - 2026

TEST - 7 (Code-C)

Click here for Code-D sol.

Test Date : 30/03/2025

ANSWERS

1. (2)	37. (3)	73. (2)	109. (1)	145. (1)
2. (2)	38. (4)	74. (4)	110. (2)	146. (4)
3. (3)	39. (1)	75. (1)	111. (2)	147. (1)
4. (1)	40. (2)	76. (3)	112. (2)	148. (4)
5. (2)	41. (3)	77. (3)	113. (2)	149. (4)
6. (2)	42. (2)	78. (2)	114. (4)	150. (1)
7. (4)	43. (3)	79. (2)	115. (3)	151. (1)
8. (3)	44. (1)	80. (2)	116. (1)	152. (3)
9. (1)	45. (2)	81. (3)	117. (4)	153. (4)
10. (1)	46. (2)	82. (4)	118. (1)	154. (1)
11. (4)	47. (3)	83. (2)	119. (2)	155. (4)
12. (3)	48. (3)	84. (1)	120. (3)	156. (1)
13. (2)	49. (4)	85. (3)	121. (4)	157. (3)
14. (2)	50. (1)	86. (4)	122. (1)	158. (2)
15. (4)	51. (4)	87. (1)	123. (4)	159. (2)
16. (2)	52. (4)	88. (3)	124. (4)	160. (2)
17. (3)	53. (2)	89. (1)	125. (2)	161. (2)
18. (2)	54. (3)	90. (3)	126. (2)	162. (3)
19. (1)	55. (3)	91. (3)	127. (3)	163. (4)
20. (2)	56. (2)	92. (3)	128. (2)	164. (4)
21. (2)	57. (2)	93. (1)	129. (4)	165. (4)
22. (1)	58. (4)	94. (1)	130. (3)	166. (3)
23. (1)	59. (1)	95. (4)	131. (3)	167. (4)
24. (2)	60. (2)	96. (1)	132. (3)	168. (3)
25. (2)	61. (4)	97. (1)	133. (4)	169. (4)
26. (4)	62. (3)	98. (2)	134. (4)	170. (1)
27. (3)	63. (2)	99. (3)	135. (2)	171. (2)
28. (3)	64. (3)	100. (1)	136. (2)	172. (2)
29. (3)	65. (1)	101. (2)	137. (3)	173. (2)
30. (2)	66. (3)	102. (1)	138. (2)	174. (4)
31. (2)	67. (3)	103. (3)	139. (4)	175. (3)
32. (4)	68. (1)	104. (1)	140. (4)	176. (3)
33. (1)	69. (3)	105. (3)	141. (2)	177. (2)
34. (2)	70. (2)	106. (3)	142. (3)	178. (2)
35. (1)	71. (4)	107. (2)	143. (3)	179. (3)
36. (2)	72. (1)	108. (2)	144. (1)	180. (1)

HINTS & SOLUTIONS

[PHYSICS]

1. Answer (2)

Hint: Use $[v] = [a] = [bt] = [ct^2]$

Sol.: $\left[\frac{ab}{c^2}\right] = \left[\frac{(v)(v/t)}{(v)^2 \times \frac{1}{t^4}}\right] = [t^3]$

$\left[\frac{ab}{c^2t^3}\right] = [M^0L^0T^0]$

2. Answer (2)

Hint: L.C = 1 MSD – 1 VSD

Sol.: 1 MSD is equal to 1 mm

$LC = MSD\left(1-\frac{15}{20}\right) = \frac{5\,MSD}{20}$

$= \frac{1}{4} \times 1\,mm = 0.25\,mm$

3. Answer (3)

Hint: Use displacement travelled in n^{th} second formula to find speed of projection.

Sol.: $5 = u - \frac{10}{2}(8-1)$

$5 = u - 35$

$u = 40\ m\ s^{-1}$

$h = \frac{u^2}{2g} = \frac{40 \times 40}{2 \times 10} = 80\ m$

4. Answer (1)

Hint: $\Delta v = \int a\,dt$ = area under acceleration-time graph.

Sol.: Δv = area under $a - t$ graph

$= \left(\frac{1}{2}\right)(8+4) \times 2$

$v_f - v_{in} = 12\ m\ s^{-1}$

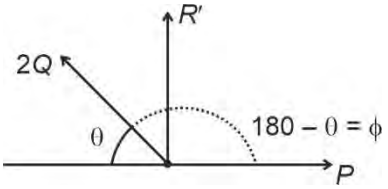
$v_{in} = 0$, given

$v_f = 12\ m\ s^{-1}$

5. Answer (2)

Hint: Horizontal component of both the vector should cancel each other on doubling Q.

Sol.:



As $\vec{R}'$ is perpendicular to $\vec{P}$. So

$2Q\cos\theta = P$

$\cos\theta = \frac{P}{2Q} = \frac{1}{2} \Rightarrow \theta = 60°$

$\phi = 180° - 60° = 120°$

6. Answer (2)

Hint: Velocity of particle after time t is $u\cos\theta\,\hat{i} + (u\sin\theta - gt)\hat{j}$

Sol.: The initial velocity is $10\hat{i} + 20\hat{j}$

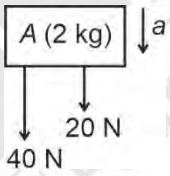
$R = \frac{2u_xu_y}{g} = \frac{2 \times 10 \times 20}{10}$

$= 40\ m$

7. Answer (4)

Hint: The spring force does not change immediately.

Sol.:



$F_{net} = ma$

$60 = 2a$

$a = 30\ m\ s^{-2}$

8. Answer (3)

Hint: Normal reaction will be responsible for providing centripetal acceleration.

Sol.: $N - Mg = \frac{Mv^2}{R}$

$N = Mg + \frac{Mv^2}{R}$

9. Answer (1)

Hint: Use conservation of linear momentum

Sol.: $KE = \frac{P^2}{2M}$

$= \frac{m^2v^2}{2 \times \frac{2}{3}m}$

$= \frac{3}{4}mv^2$

10. Answer (1)

Hint: Use work energy theorem

Sol.: $\frac{1}{2}mv^2 = mgh - \mu mg\cos\theta L$

$\frac{1}{2}mv^2 = mgh - \frac{1}{2}mg\frac{h}{\sin\theta}\cos\theta$

$\frac{1}{2}mv^2 = mgh - \frac{mgh}{2}\cot 45^\circ$

$\frac{1}{2}mv^2 = \frac{mgh}{2}$

$v = \sqrt{gh}$

11. Answer (4)

Hint & Sol.: The particle will move in uniform circular motion. In uniform circular motion both acceleration and velocity are variable.

12. Answer (3)

Hint & Sol.: Adding water will first shift COM downward and when it is completely filled, then COM again shifts to centre.

13. Answer (2)

Hint: Use parallel axis theorem $I_{AA'} = I + Md^2$

Sol.: $Mk^2 = \frac{MR^2}{4} + \frac{MR^2}{4}$

$Mk^2 = \frac{2}{4}MR^2$

$k = \frac{R}{\sqrt{2}}$

14. Answer (2)

Hint: Rotational kinetic energy $= \frac{1}{2}I\omega^2$

Sol.: K·E = $\frac{1}{2}\frac{MR^2}{2}\omega^2$

$\text{K·E} = \frac{1}{2}\times 10\times\left(\frac{20}{100}\right)^2\times\frac{1}{2}\times(7\times 2\pi)^2$

$= \frac{1}{4}\times 10\times\frac{1}{25}\times\left(7\times 2\times\frac{22}{7}\right)^2$

$= \frac{10}{100}\times 44\times 44$

= 193.6 J

15. Answer (4)

Hint: Use, $g' = \frac{GM}{(R+h)^2}$

Sol.: $g' = \frac{GM}{(R+h)^2}$

$\frac{3}{4}\frac{GM}{R^2} = \frac{GM}{(R+h)^2}$

$\sqrt{\frac{4}{3}}R = R + h$

$h = \left(\frac{2}{\sqrt{3}} - 1\right)R$

16. Answer (2)

Hint & Sol.:

(i) Kepler's first law is law of orbit

(ii) Kepler's second law is law of area

(iii) Kepler's third law is law of periods

17. Answer (3)

Hint & Sol.: If a body is projected with escape speed then only its kinetic energy at far away point is zero and for a bounded system the force is always attractive and total energy is negative.

18. Answer (2)

Hint: Angular impulse = change in angular momentum

Sol.: $[\Delta I] = [mvr]$

$= [ML^2T^{-1}]$

19. Answer (1)

Hint: Use $\Delta l = \frac{Fl}{AY}$

Sol.: $\Delta l = \frac{Fl}{A.Y} = \frac{F}{\pi r^2}\frac{l}{Y}$

$\frac{\Delta l_2}{\Delta l_1} = \left(\frac{r_1}{r_2}\right)^2 = \frac{1}{4}$

$\Delta l_2 = \frac{1}{4}\times\Delta l_1$

$\Delta l_2 = \frac{1}{4}\times 4 = 1\,\text{mm}$

20. Answer (2)

Hint & Sol.: There is no effect of variation in acceleration on the volume displaced.

21. Answer (2)

Hint: Viscous force is directly proportional to speed.

Sol.: $a = \frac{mg - F_B - F_v}{m} = \frac{mg - \rho Vg - 6\pi\eta rv}{m}$

At velocity greater than terminal velocity, viscous force provides deceleration till terminal velocity is achieved.

22. Answer (1)

Hint: Radiation power (P) = $\sigma \cdot e\, AT^4$

Sol.: $\frac{E_2}{E_1} = \left(\frac{T_2}{T_1}\right)^4$

T_1 = (273 + 327) K

= 600 K

T_2 = 600 K + 600 K = 1200 K

$\left(\frac{E_2}{E_1}\right) = \left(\frac{1200}{600}\right)^4$

$E_2 = 16E$

23. Answer (1)

Hint: Use Newton's law of cooling

Sol.: Rate of cooling will increase as the difference of temperature of body and ambient temperature increases.

24. Answer (2)

Hint: Change in internal energy $\Delta U = n\, C_V \Delta T$

Sol.: $\Delta W = -\Delta U$

$= -n\, C_V \Delta T$

$= -n\frac{5}{2} R(300) = -750\, nR$

25. Answer (2)

Hint: Use $v_{max} = A\omega$

Sol.: $T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2}{100}} = \frac{\pi\sqrt{2}}{5}$ s

$v_{max} = A\omega$

$= 0.4 \times \frac{2\pi}{T} \Rightarrow \frac{0.4 \times 2\pi \times 5}{\pi\sqrt{2}}$

$v_{max} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$ m/s

26. Answer (4)

Hint: Use equation of velocity and acceleration

Sol.: $a = -\omega^2 A \sin\omega t$

$v = \omega A \cos\omega t$

$\sin^2(\omega t) + \cos^2(\omega t) = \frac{a^2}{\omega^4 A^2} + \frac{v^2}{\omega^2 A^2}$

$1 = \frac{a^2}{\omega^4 A^2} + \frac{v^2}{\omega^2 A^2}$

27. Answer (3)

Hint: Time period of simple pendulum of $T = 2\pi\sqrt{\frac{l}{g}}$

Sol.: $g' = \frac{GM}{(R + R/2)^2} = \frac{4}{9}\frac{GM}{R^2} = \frac{4}{9} g$

$\frac{T_2}{T_1} = \sqrt{\frac{g_1}{g_2}} = \sqrt{\frac{g}{\frac{4}{9}g}}$

$\frac{T_2}{T_1} = \sqrt{\frac{9}{4}} = \frac{3}{2}$

28. Answer (3)

Hint: The general equation of harmonic wave travelling along negative x-axis is given by

$y = A \sin(kx + \omega t)$

Sol.: $y = 2\sin\left(\frac{2\pi}{\frac{\pi}{2}} x + 2\pi \times \frac{1}{\pi} t\right)$

$y = 2\sin(4x + 2t)$

29. Answer (3)

Hint: Frequency of sound wave remains constant in different medium.

Sol.: $v = \lambda f \Rightarrow f = \frac{v}{\lambda} =$ constant

$\frac{3500}{\lambda} = 500 \Rightarrow \lambda = 7$ m

λ = 700 cm

30. Answer (2)

Hint & Sol.: $C_p - C_v = R$ is true for any ideal gas. A polyatomic molecule will have three translational degree of freedom.

$< v >= \sqrt{\frac{8RT}{\pi M}} \Rightarrow < v >^2 = \frac{8RT}{\pi M}$

$< v^2 > = \frac{3RT}{M}$

31. Answer (2)

Hint: Breaking stress is the maximum stress that cable can bear.

Sol.: $\sigma = \frac{m(g+a)4}{\pi d^2} \Rightarrow d = \left[\frac{4\, m(g+a)}{\pi\sigma}\right]^{\frac{1}{2}}$

32. Answer (4)

Hint: Intensity $\propto A^2$ and $\frac{I_{max}}{I_{min}} = \left(\frac{A_1 + A_2}{A_1 - A_2}\right)^2$

Sol.: f_1 = 300 Hz and f_2 = 304 Hz

Δf = 4 Hz

$\frac{I_{max}}{I_{min}} = \left(\frac{4+3}{4-3}\right)^2 = \frac{49}{1}$

33. Answer (1)

Hint: Use $v = \omega\sqrt{A^2 - x^2}$

Sol.: $v = \omega\sqrt{A^2 - x^2}$

$A\omega = v_{max}$

$4\omega = 4 \Rightarrow \omega = 1$ rad s^{-1}

$v = 1\sqrt{4^2 - x^2}$

$2^2 = 4^2 - x^2$

$x^2 = 16 - 4$

$x^2 = 12$

$x = 2\sqrt{3}$ cm

34. Answer (2)

Hint: $\Delta U = nC_V\Delta T$

Sol.: $\Delta Q = nC_P\Delta T = \frac{5}{2}nR\Delta T$

$3Q = 5\left(\frac{3}{2}nR\Delta T\right) \Rightarrow \frac{3}{5}Q = \Delta U$

35. Answer (1)

Hint: Heat current = $\frac{kA(T_1 - T_2)}{L}$

Sol.: $Q_1 = \frac{k(T_1 - T_2)A}{L}$

$Q_2 = \frac{k(T_1 - T_2)4A}{2L}$

$Q_2 = 2Q_1 = 2Q$

36. Answer (2)

Hint & Sol.: The working of venturimeter is based on Bernoulli's theorem.

37. Answer (3)

Hint: $\frac{\text{Strain}}{\text{Stress}} = \frac{1}{Y}$

Sol.: $Y = \frac{T}{A}\frac{L}{\Delta L}$

$\frac{\Delta L}{T} = \frac{L}{AY} = \tan\theta$

For the given condition $\tan\theta \propto \frac{1}{A}$

$\tan\theta_A > \tan\theta_B > \tan\theta_C$

$A_A < A_B < A_C$

Wire C is thickest wire.

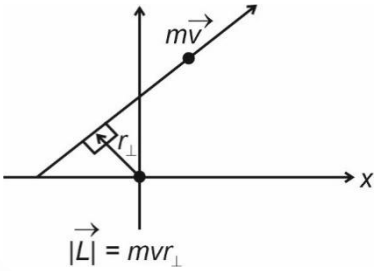
38. Answer (4)

Hint & Sol.: The gravitational potential is $\frac{-3}{2}\frac{GM}{R}$ at centre and zero at infinity.

39. Answer (1)

Hint: Use $L = mvr\sin\theta = mvr_\perp$

Sol.:



For constant velocity, $r_\perp$ remains constant so angular momentum is constant.

40. Answer (2)

Hint: Set of equal and opposite force acting on a body on different lines of action is called couple.

Sol.: $\vec{F}_1 + \vec{F}_2 = 0$

$\vec{F}_1 \times \vec{r}_1 + \vec{F}_2 \times \vec{r}_2 \neq 0$

41. Answer (3)

Hint: At maximum extension the friction force reaches limiting value.

Sol.: From energy conservation:

$2gx = \frac{1}{2}kx^2$

$x = \frac{4g}{k}$

At maximum extension

$kx = \mu \times 10 \times g$

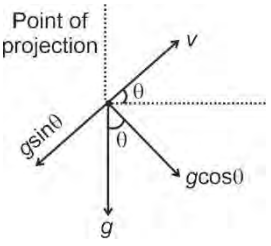
$4g = \mu \times 10 \times g$

$\mu = \frac{4}{10} = 0.4$

42. Answer (2)

Hint: Rate of change of speed is tangential acceleration.

Sol.:



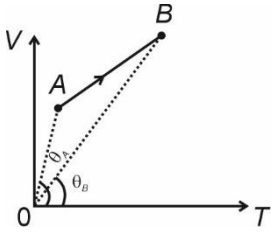
43. Answer (3)

Hint & Sol.: At the point of return, body stops instantaneously and then changes its direction of motion. Acceleration is constant so it does not change its direction.

44. Answer (1)

Hint: Use slope of straight line

Sol.:



$\frac{V}{T} \propto \frac{1}{P}$

$\left(\frac{V}{T}\right)_A > \left(\frac{V}{T}\right)_B$

$\frac{1}{P_A} > \frac{1}{P_B}$

So $P_B > P_A$

45. Answer (2)

Hint & Sol.: $v = \frac{D}{t} = \frac{200}{20} = 10\ \text{m s}^{-1}$

$\frac{\Delta v}{v} = \pm\left(\frac{\Delta D}{D} + \frac{\Delta t}{t}\right)$

$\Delta v = \pm v\left[\frac{4}{200} + \frac{0.2}{20}\right]$

$\Delta v = \pm\left[\frac{4}{20} + \frac{0.2}{2}\right]$

= ±[0.2 + 0.1] = ±0.3

[CHEMISTRY]

46. Answer (2)

Hint: The normal oxide formed by the element on extreme left is most basic, whereas that formed by the element on extreme right of periodic table is the most acidic.

Sol.: $Cl_2O_7 \rightarrow$ Acidic

$As_2O_3 \rightarrow$ Amphoteric

$N_2O \rightarrow$ Neutral

$Na_2O \rightarrow$ Basic

47. Answer (3)

Hint: On moving left to right the ionisation enthalpy generally increases.

Sol.:

Element	Ionisation enthalpy (kJ/mol)
Li	520
Be	899
B	801
C	1086
N	1402
O	1314
F	1681
Ne	2080

48. Answer (3)

Hint & Sol.:

	%	Mole	Mole Ratio
C	80	80/12 = 6.66	6.66/6.66 = 1
H	20	20/1 = 20	20/6.66 ≃ 3

Empirical formula = CH_3

49. Answer (4)

Hint: Number of moles = $\frac{\text{Given mass}}{\text{molar mass}}$

Sol.: Number of atoms in 1 g C = $\frac{1}{12} N_A$

Number of atoms in 1 g $O_2 = 2 \times \frac{1}{32} N_A = \frac{1}{16} N_A$

Number of atoms in 1 g $N_2 = 2 \times \frac{1}{28} N_A = \frac{1}{14} N_A$

Number of atoms in 1 g $H_2 = 2 \times \frac{1}{2} N_A = N_A$

50. Answer (1)

Hint: Molarity = $\frac{\text{no. of moles of solute}}{\text{volume of solution in L}}$

Sol.: Number. of moles of methanol required = M × V

= 0.3 × 3 = 0.9

Mass of methanol required = moles × molar mass
= 0.9 × 32 = 28.8 g
Volume of methanol

$= \frac{\text{mass}}{\text{density}} = \frac{28.8}{0.793} = 36.32\ \text{mL}$

51. Answer (4)

Hint: Number of angular nodes = l

Sol.:

Orbitals	Number of angular nodes
1*s*	0
2*p*	1
4*d*	2
4*f*	3

52. Answer (4)

Hint: Lyman series gives spectral lines in UV region

Sol.: Balmer series gives spectral lines in visible region.

53. Answer (2)

Hint: $\lambda = \frac{h}{mv}$

Sol.: $m = \frac{h}{\lambda v}$

$= \frac{6.626 \times 10^{-34}}{3.313 \times 10^{-10} \times 3 \times 10^{8}}$

$= 0.667 \times 10^{-32}$

$= 6.67 \times 10^{-33}$ kg

54. Answer (3)

Hint: Statement I is Pauli's exclusion principle.

Sol.: In the ground state of the atoms the orbitals are filled in order of their increasing energies.

55. Answer (3)

Hint: As the number of bonds increases bond lengths decreases.

Sol.:

Species	Bond lengths (pm)
F – F	144
O = O	121
N ≡ N	109

56. Answer (2)

Hint: Pt in $[PtCl_4]^{2-}$ is dsp^2 hybridised

Sol.: $NH_3 \rightarrow sp^3$

$PCl_5 \rightarrow sp^3d$

$BrF_5 \rightarrow sp^3d^2$

57. Answer (2)

Hint: During hybridisation, the orbitals present in valence shell having almost equal energy are hybridised.

Sol.: Filled orbitals of valence shell take part in hybridisation in some cases.

58. Answer (4)

Hint: Dipole moment is a vector quantity whose value depends on shape and bond moment of the molecules.

Sol.: CH_4, BF_3, CO_2, SO_3 have zero dipole moment.

59. Answer (1)

Hint & Sol: ΔS_{total} is not zero irreversible expansion of an ideal gas under isothermal condition.

60. Answer (2)

Hint: The process is adiabatic, hence q = 0

Sol.: $\Delta U = q + w$

$\Delta U = w \quad (\because q = 0)$

$w = -P\Delta V$

$= -4 \times (6.75 - 1.25)$

$w = -22$ L atm

$w = -22 \times 101.3$

$w = -2.23$ kJ $= \Delta U$

61. Answer (4)

Hint: $\Delta_r H = \Delta_f H(\text{product}) - \Delta_f(\text{reactant})$

Sol.: $\Delta_r H = \Delta_f H\ CO_2(g) - \Delta_f H\ CO(g)$

$= -393.51 - (-110.53)$

$= -393.51 + 110.53$

$= -282.98$ kJ mol^{-1}

62. Answer (3)

Hint: One H^+ is added in the species to get conjugate acid.

Sol.: $H^+ + HSO_4^- \rightarrow H_2SO_4$

63. Answer (2)

Hint: If a reaction is multiplied by n, $K' = (K)^n$

Sol.: $2SO_2 + O_2 \rightleftharpoons 2SO_3$, K_1 ....(1)

$SO_3 + H_2SO_4 \rightleftharpoons H_2S_2O_7$, K_2 .... (2)

$H_2S_2O_7 + H_2O \rightleftharpoons 2H_2SO_4$, K_3 .... (3)

On applying (1) + 2 × (2) + 2 × (3) we get,

$2SO_2 + O_2 + 2H_2O \rightleftharpoons 2H_2SO_4$

So, $K = K_1 \times K_2^2 \times K_3^2$

64. Answer (3)

Hint: $K_a \times K_b = 10^{-14}$ at 298 K

Sol.: $K_a = \frac{10^{-14}}{K_b}$

$= \frac{10^{-14}}{4.27 \times 10^{-10}} = 0.234 \times 10^{-4} = 2.34 \times 10^{-5}$

65. Answer (1)

Hint: Acidic strength of hydrides of 2nd period elements depends upon bond polarity.

Sol.: As the electronegativity of element increases, bond polarity increases, the strength of the acid increases.

66. Answer (3)

Hint: Sn in +4 oxidation state is more stable so it acts as reducing agent in +2 oxidation state.

Sol.: Pb compounds in +2 oxidation state are stable.

67. Answer (3)

Hint: Gallium has least melting point among group 13 elements.

Sol.: The electronegativity order of group 13 elements is B > Tl > In > Ga > Al.

68. Answer (1)

Hint & Sol.: $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{2-}$ is not exist because

(i) Six large Cl^- ions cannot be accommodated around Si^{4+} due to limitation of its size.

(ii) Interaction between lone pair of Cl^- ion and Si^{4+} is not very strong.

69. Answer (3)

Hint & Sol.: Balanced equation is

$Cr_2O_7^{2-} + 3SO_3^{2-} + 8H^+ \rightarrow 2Cr^{3+} + 3SO_4^{2-} + 4H_2O$

70. Answer (2)

Hint: $CH_4 + 2O_2 \xrightarrow{\Delta} CO_2 + 2H_2O$;Combination reaction

Sol.: $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$; Decomposition reaction

$Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$; Displacement reaction

$Cl_2 + 2OH^- \longrightarrow ClO^- + Cl^- + H_2O$;

Disproportionation reaction

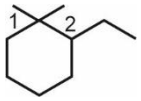
71. Answer (4)

Hint: Higher the standard electrode potential higher is the oxidising power of halogen.

Sol.: $F_2 > Cl_2 > Br_2 > I_2$ as per decreasing order of standard electrode potential values.

72. Answer (1)

Hint & Sol:



IUPAC name:

2-Ethyl-1, 1-dimethylcyclohexane.

73. Answer (2)

Hint: Percentage of halogen = $\frac{\text{Atomic mass of X} \times \text{Given mass of AgX} \times 100}{\text{molecular mass of AgX} \times \text{Mass of organic compound}}$

Sol.: Percentage of Br = $\frac{80 \times 0.12 \times 100}{188 \times 0.30}$

= 17.02%

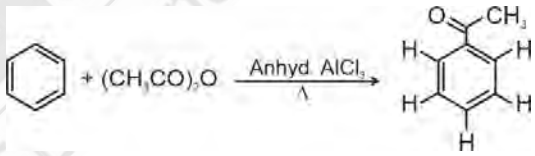
74. Answer (4)

Hint: Tropone is a non-benzenoid aromatic compound.

Sol.: Hyperconjugation is delocalisation of σ electrons of C–H bond of an alkyl group directly attached to an atom of unsaturated system or to an atom with unshared *p* orbital.

75. Answer (1)

Hint: It is Friedel-Crafts acylation reaction



Sol.:

Number of σ bonds = 17

Number of π bonds = 4

76. Answer (3)

Hint & Sol.:

$2CH_3CH_3 + 3O_2 \xrightarrow[\Delta]{(CH_3COO)_2Mn} 2CH_3COOH + 2H_2O$

77. Answer (3)

Hint & Sol.: Buckminsterfullerene contains twenty six-membered rings and twelve five-membered rings.

78. Answer (2)

Hint: mmol of HNO_3 required = 800 × 3 = 2400

Sol.: Mass of $HNO_3 = 2400 \times 10^{-3} \times 63 = 151.2$ g

70 g of HNO_3 is present in 100 g of concentrated solution

Mass of concentrated HNO_3 required =

$\frac{100 \times 151.2}{70} = 216$ g

79. Answer (2)

Hint: For a given value of n,

l = 0, 1, ... (n –1)

Sol.: For given value of l

m = –l ....0.... +l

so if l = 1, m = –1, 0, +1

therefore option (2) is not possible.

80. Answer (2)

Hint: Kinetic energy = $h(\nu - \nu_0)$

Sol.: KE = $6.626 \times 10^{-34} (1 \times 10^{15} - 1 \times 10^{14})$

$= 6.626 \times 10^{-34} (10 - 1) \times 10^{14}$

$= 6.626 \times 10^{-34} \times 9 \times 10^{14}$ J

$= 59.634 \times 10^{-20} = 5.96 \times 10^{-19}$ J

81. Answer (3)

Hint: Bond order = $\frac{1}{2}(N_b - N_a)$

Sol.: Bond order of $N_2 = \frac{1}{2}(10-4) = 3$

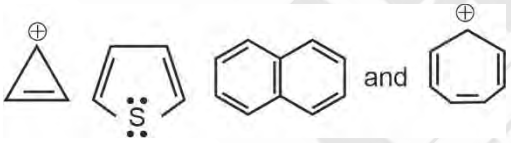
Bond order of $N_2^+ = \frac{1}{2}(9-4) = 2.5$

Bond order of $O_2 = \frac{1}{2}(10-6) = 2$

Bond order of $O_2^- = \frac{1}{2}(10-7) = 1.5$

82. Answer (4)

Hint : Cyclic planar species having $(4n + 2)\pi$ electrons in conjugation are aromatic in nature. (n = 0, 1, 2…)

Sol.:  and

are aromatic in nature

 and  are antiaromatic species

83. Answer (2)

Hint: K_{sp} of $Ni(OH)_2 = [Ni^{2+}][OH^-]^2$

Sol.: Let the solubility be S

$$Ni(OH)_2 \rightleftharpoons Ni^{2+} + 2OH^-$$

S 0 0

0 S 2S

$$NaOH \rightarrow Na^+ + OH^-$$

0.01 0 0

0 0.01 0.01

$K_{Sp} = [Ni^{2+}] [OH^-]^2$

$[OH^-] = 2S + 0.01 \simeq 0.01]$

$2 \times 10^{-15} = S \times (0.01)^2$

$$S = \frac{2 \times 10^{-15}}{10^{-4}} = 2 \times 10^{-11} \text{ M}$$

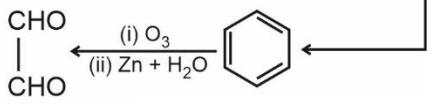
84. Answer (1)

Hint & Sol.: H_3BO_3 is monobasic acid

$$H_3BO_3 + 2H_2O \rightleftharpoons B(OH)_4^- + H^+$$

85. Answer (3)

Hint: $CaC_2 + H_2O \rightarrow Ca(OH)_2 + C_2H_2$

Sol.: $CaC_2 + H_2O \longrightarrow C_2H_2 \xrightarrow[873\text{ K}]{\text{Red hot Fe Tube}}$ 

86. Answer (4)

Hint & Sol.: Aniline is separated from aniline water mixture by steam distillation.

87. Answer (1)

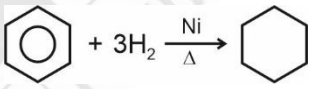
Hint: PbS is black colour

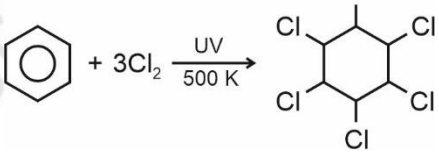
Sol.: $[Fe(CN)_5NOS]^{4-} \rightarrow$ Violet

$[Fe(SCN)]^{2+} \rightarrow$ Blood red

$Fe_4[Fe(CN)_6]_3 \cdot xH_2O \rightarrow$ Prussian blue

88. Answer (3)

Hint: 

Sol.: 

89. Answer (1)

Hint: $pH = pK_a + \log\frac{[Salt]}{[Acid]}$

Sol.: $4.8 = 4.8 + \log\frac{[Salt]}{[Acid]}$

$$\log\frac{[Salt]}{[Acid]} = 0$$

$$\frac{[Salt]}{[Acid]} = 1$$

So, $[CH_3COONa] = [CH_3COOH] = 0.1$

90. Answer (3)

Hint: Internal energy is an extensive property.

Sol.: Molar heat capacity is an intensive property.

[BIOLOGY]

91. Answer (3)

Hint: Pteridophytes have much more differentiated plant body than the bryophytes.

Sol.: In pteridophytes, the main plant body is a sporophyte which is differentiated into true roots, stems and leaves. In some cases, sporophylls may form distinct compact structures called strobili or cones.

92. Answer (3)

Hint: r is the relative growth rate in the exponential growth of an organism.

Sol.: The exponential growth can be expressed as $W_1 = W_0 e^{rt}$. Here, r is the relative growth rate and is also the measure of the ability of the plant to produce new plant material, referred to as efficiency index.

93. Answer (1)

Hint: This hormone promotes cell division.

Sol.: Cytokinins help to overcome the apical dominance that occurs due to auxin.

94. Answer (1)

Hint: E. Kurosawa reported the appearance of symptoms of the disease in the rice seedlings when they were treated with sterile filtrate of the fungus.

Sol.: Auxin was isolated by F.W. Went from tips of coleoptiles of oat seedlings.

95. Answer (4)

Hint: Phosphofructokinase is the pacemaker enzyme of glycolysis.

Sol.: Phosphofructokinase catalyses conversion of fructose-6-phosphate to fructose-1, 6-bisphosphate. Citrate synthase catalyses conversion of Acetyl CoA and OAA to 6C organic acid, citric acid. Pyruvic acid decarboxylase catalyses the conversion of pyruvic acid to acetaldehyde. Invertase catalyses the conversion of sucrose to glucose and fructose.

96. Answer (1)

Hint: Methanogens are archaebacteria.

Sol.: Archaebacteria differ from other bacteria in having a different cell wall structure and this feature is responsible for their survival in extreme conditions. Methanogens are present in the gut of several ruminant animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals.

97. Answer (1)

Hint: Fats would need to be broken down into glycerol and fatty acids first.

Sol.: Glycerol would enter the pathway after being converted to PGAL. In both lactic acid and alcohol fermentation, not much energy is released; less than seven per cent of the energy in glucose is released and not all of it is trapped as high energy bonds of ATP.

98. Answer (2)

Hint: This ion acts as a cofactor for various enzymes.

Sol.:

$$\text{Pyruvic acid} + \text{CoA} + \text{NAD}^+ \xrightarrow[\text{Pyruvate dehydrogenase}]{Mg^{2+}} \text{Acetyl CoA} + CO_2 + \text{NADH} + H^+$$

99. Answer (3)

Hint: Tripalmitin is a fatty acid molecule.

Sol.: RQ of tripalmitin is 0.7.

100. Answer (1)

Hint: Lower the taxa, more are the characteristics that the members within the taxon share.

Sol.: Members of the same species will have the highest number of common characteristics.

101. Answer (2)

Hint: Maize is a C_4 plant and tomato is a C_3 plant.

Sol.: In Maize, 5 ATPs and 2 $NADPH_2$ are used for the fixation of one CO_2 molecule. Photorespiration does not take place in C_4 plants. They show CO_2 saturation at about 360 µl L^{-1} and do not show increase in photosynthesis at low light intensities.

102. Answer (1)

Hint: Non-cyclic photophosphorylation involves both PS-I and PS-II.

Sol.: Non-cyclic photophosphorylation requires water as an external electron donor.

103. Answer (3)

Hint: This scientist also showed that sunlight is essential to the plant process.

Sol.: Jan Ingenhousz showed that it is only the green part of the plants that could release oxygen.

104. Answer (1)

Hint: Gas required for aerobic respiration is released during light reaction of photosynthesis.

Sol.: CO_2 fixation takes place during dark reaction. ATP, NADPH + H^+ and O_2 are the products of light reaction of photosynthesis.

105. Answer (3)

Hint: Both *Pinus* and *Cycas* belong to gymnosperms.

Sol.: As both are gymnosperms, they are heterosporous in nature.

106. Answer (3)

Hint: Compound epithelium

Sol.: Lining of stomach and intestine possesses simple columnar epithelium which helps in secretion and absorption.

Inner lining of ducts of salivary glands is multi-layered and thus has a limited role in secretion and absorption. Their main function is to provide protection from chemical and mechanical stresses.

107. Answer (2)

Hint: Storage polysaccharide in plants

Sol.: Glucose is a monosaccharide.

Cellulose does not contain complex helices and hence cannot hold I_2.

Glycogen gives reddish-brown colour with iodine.

Starch can hold I_2 molecules in the helical portion and gives blue colour.

108. Answer (2)

Hint: Tidal volume × number of breaths/min

Sol.: Volume of air inspired or expired during a normal respiration is tidal volume. It is approx. 500 mL *i.e.*, a healthy man can inspire or expire approximately 6000 to 8000 mL of air per minute.

Inspiratory Reserve Volume = 2500 to 3000 mL

Expiratory Reserve Volume = 1000 to 1100 mL

109. Answer (1)

Hint: pCO_2 in systemic artery = 40 mm Hg

Sol.:

Respiratory Gas	Atmospheric Air	Alveoli	Blood (Deoxy-genated)	Blood (Oxygenated)	Tissues
O_2	159	104	40	95	40
CO_2	0.3	40	45	40	45

110. Answer (2)

Hint: Universal recipients

Sol.:

Blood Group	Antigens on RBCs	Antibodies in Plasma	Donor's Group
A	A	anti-B	A, O
B	B	anti-A	B, O
AB	A, B	Nil	AB, A, B, O
O	Nil	anti-A, B	O

111. Answer (2)

Hint: It alters carbohydrate metabolism.

Sol.: Addison's disease – Hyposecretion of adrenal cortex hormones leading to fatigue and acute weakness. Catecholamines are secreted from adrenal medulla.

Prolonged hyperglycemia leads to a complex disorder called diabetes mellitus which is associated with loss of glucose through urine and formation of harmful compounds known as ketone bodies.

112. Answer (2)

Hint: Identify a cephalochordate and a urochordate respectively.

Sol.: 'X' is *Amphioxus* or lancelet and in it, notochord extends from head to tail region and is persistent throughout life.

'Y' is *Salpa* in which, notochord is present only in larval tail.

Petromyzon (Lamprey) and hagfish belong to the class Cyclostomata.

113. Answer (2)

Hint: Terrestrial adaptations were acquired to conserve water.

Sol.: Terrestrial adaptions necessitated the production of lesser toxic nitrogenous wastes like urea and uric acid for conservation of water.

Increasing order of toxicity of nitrogenous wastes: Uric acid < Urea < Ammonia.

114. Answer (4)

Hint: Phylum Coelenterata

Sol.: Presence of cnidoblasts or cnidocytes is a feature of cnidarians. Cnidoblasts are used for anchorage, defense and for capture of prey.

115. Answer (3)

Hint: Each limb has 30 bones.

Sol.:

Total number of vertebrae	26
Total number of ribs	12 pairs = 24 ribs
Sum total of cranial and facial bones	8 + 14 = 22 bones
Sum total of phalanges in both hands	14 + 14 = 28 bones

116. Answer (1)

Hint: Syncytium forms when karyokinesis is not followed by cytokinesis.

Sol.: In plant cells, cytokinesis is achieved by the formation of a cell plate. Phragmoplast is formed by Golgi complex and grows centrifugally to form cell plate.

117. Answer (4)

Hint: In animal cells, centriole duplication takes place in S phase.

Sol.: In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm.

118. Answer (1)

Hint: This is the phase of actual cell division.

Sol.: M phase is the most dramatic period of the cell cycle, involving a major reorganisation of virtually all components of the cell.

119. Answer (2)

Hint: *Agaricus* belongs to this class of fungi.

Sol.: Basidiomycetes produce sexual spores exogenously. These sexual spores are known as basidiospores.

120. Answer (3)

Hint: Electron microscopic studies of eukaryotic cells reveal the presence of a network or reticulum of tiny tubular structures scattered in the cytoplasm that is called the endoplasmic reticulum.

Sol.: ER divides the intracellular space into two distinct compartments, *i.e.*, luminal (inside ER) and extra luminal (cytoplasm) compartments.

121. Answer (4)

Hint: Centriole shows cartwheel appearance.

Sol.: Centriole is surrounded by massule.

122. Answer (1)

Hint: Storage of biomolecules is performed by leucoplasts.

Sol.: Amyloplasts store carbohydrates (starch), e.g., potato; elaioplasts store oils and fats whereas the aleuroplasts store proteins.

123. Answer (4)

Hint: The telocentric chromosome has a terminal centromere.

Sol.: In case of acrocentric chromosome the centromere is situated close to its one end, forming one extremely short and one very long arm.

124. Answer (4)

Hint: Name of the family generally ends with 'eae'.

Sol.: Convolvulaceae is a family.

125. Answer (2)

Hint: In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells.

Sol.: When the bulliform cells in the leaves have absorbed water and are turgid, the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inwards to minimise water loss.

126. Answer (2)

Hint: Steler region of roots and stems also has ground tissues.

Sol.: All tissues on the innerside of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

127. Answer (3)

Hint: The outermost layer of a dicot root is epiblema.

Sol.: In dicot roots, the tangential as well as radial walls of the endodermal cells have a deposition of water-impermeable, waxy material suberin in the form of casparian strips.

128. Answer (2)

Hint: Chilli belongs to Solanaceae family.

Sol.: Chilli shows valvate aestivation, bilocular ovary, actinomorphic flowers, persistent calyx, epipetalous stamen and endospermous seeds.

129. Answer (4)

Hint: Flowers of mustard and China rose are actinomorphic and phyllotaxy is alternate.

Sol.: Mustard shows parietal placentation while China rose shows axile placentation.

130. Answer (3)

Hint: Floridean starch is found in red algae.

Sol.: Floridean starch as stored food material is found in *Polysiphonia.*

131. Answer (3)

Hint: It consists of microvilli

Sol.:

Walls of blood vessels	–	Squamous epithelium
Bronchioles	–	Ciliated epithelium
Lining of small intestine	–	Brush-bordered columnar epithelium
Dry surface of skin	–	Compound epithelium

132. Answer (3)

Hint: Exclude the part of midbrain

Sol.: The brain of a frog is divided into forebrain, midbrain and hindbrain. Forebrain includes olfactory lobes, paired cerebral hemispheres and unpaired diencephalon.

The midbrain is characterised by a pair of optic lobes.

Hindbrain consists of cerebellum and medulla oblongata.

133. Answer (4)

Hint: Secretin and CCK, both act on pancreas.

Sol.:

- Gastrin acts on gastric glands and stimulates the secretion of HCl and pepsinogen.
- Secretin acts on the exocrine pancreas and stimulates the secretion of water and bicarbonate ions.
- CCK acts on both pancreas and gall bladder and stimulates the secretion of pancreatic enzymes and bile juice respectively.
- GIP inhibits gastric secretion and motility.

134. Answer (4)

Hint: ADH is also called vasopressin.

Sol.: Osmoreceptors in the body are activated by changes in blood volume, body fluid volume and ionic concentration.

An excessive loss of fluid from the body can activate these receptors which stimulate the hypothalamus to release ADH or vasopressin from neurohypophysis.

135. Answer (2)

Hint: Cephalochordate

Sol.: *Ascidia*, *Salpa* and *Doliolum* are urochordates, while *Branchiostoma* is a cephalochorodate.

136. Answer (2)

Hint: HMM projects outwards on thick filament at regular intervals.

Sol.: Each meromyosin has two important parts, a globular head with short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter, the light meromyosin (LMM). The HMM component *i.e.*, head and short arm projects outwards at regular intervals.

137. Answer (3)

Hint: Limbic system is a part of forebrain.

Sol.: Limbic system is a complex structure formed by inner parts of cerebral hemispheres and a group of associated deep structures like amygdala, hippocampus, *etc*.

Along with hypothalamus, it is involved in regulation of sexual behaviour, expression of emotional reactions (*e.g.* excitement, pleasure, rage, fear), motivation and olfaction.

Respiration, cardiovascular reflexes and gastric secretions are controlled by medulla of hindbrain.

138. Answer (2)

Hint: Maximum amount of CO_2 is carried as bicarbonate.

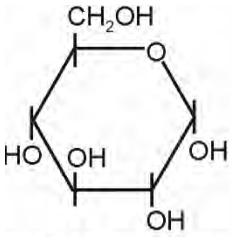
Sol.: Nearly 20-25% of CO_2 is transported by RBCs whereas 70% of it is carried as bicarbonate. About 7% of CO_2 is carried in a dissolved state through plasma.

Carbon monoxide combines with haemoglobin to form carboxyhaemoglobin.

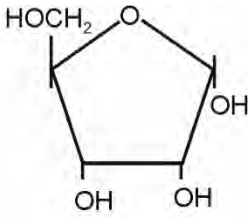
139. Answer (4)

Hint: Glucose and fructose are hexose sugars.

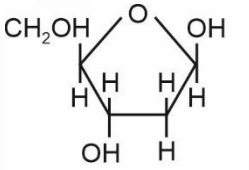
Sol.:



$C_6H_{12}O_6$ (Glucose)



$C_5H_{10}O_5$ (Ribose)



Deoxyribose ($C_5H_{10}O_4$)

140. Answer (4)

Hint: One which leads to ventricular systole

Sol.:

P-wave	–	Electrical excitation of atria (atrial depolarisation)
QRS complex	–	Ventricular depolarisation
T-wave	–	Ventricular repolarisation and end of T-wave marks the end of ventricular systole

141. Answer (2)

Hint: Posterior pituitary is under direct neural regulation of hypothalamus.

Sol.: Neurohypophysis (Pars nervosa), also known as posterior pituitary, stores and releases two hormones called oxytocin and vasopressin, which are actually synthesised by the hypothalamus and are transported axonally to neurohypophysis.

ACTH stimulates the synthesis and secretion of steroid hormones called glucocorticoids from the adrenal cortex.

142. Answer (3)

Hint: Weak bonds are broken

Sol.: Activity of an enzyme declines both below and above the optimum value. Low temperature preserves the enzyme in temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

143. Answer (3)

Hint: This structure is represented by tympanum.

Sol.: On land, buccal cavity, skin and lungs act as respiratory organs

- In female frogs, ureters and oviducts open separately in the cloaca.
- RBCs are nucleated and contain red-coloured pigment called haemoglobin.

144. Answer (1)

Hint: Fibrins are network of threads.

Sol.: Fibrins are formed by conversion of inactivated fibrinogens in the plasma by the enzyme thrombin. Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase is required for the above conversion.

145. Answer (1)

Hint: Intervertebral disc

Sol.: The intercellular material of cartilage is solid and pliable, and resists compression. Cells of this tissue are enclosed in small cavities within the matrix secreted by them. Cartilage is present between adjacent vertebrae of the vertebral column.

146. Answer (4)

Hint: Homopolymer of glucose

Sol.:

Pigments	Carotenoids, Anthocyanins, *etc.*
Alkaloids	Morphine, Codeine, *etc.*
Terpenoids	Monoterpenes, Diterpenes *etc.*
Essential oils	Lemon grass oil, *etc.*
Toxins	Abrin, Ricin
Lectins	Concanavalin A
Drugs	Vinblastin, curcumin, *etc.*
Polymeric substances	Rubber, gums, cellulose

147. Answer (1)

Hint: Occupational respiratory disease

Sol.: In industries that involve grinding or stone-breaking, so much dust is produced that the defense mechanism of the body cannot fully cope with the situation. Long exposure can give rise to inflammation leading to fibrosis (proliferation of fibrous tissues) and thus causing serious lung damage.

148. Answer (4)

Hint: Also known as farmer's friend

Sol.: Nephridia – *Nereis*, earthworm

Green glands – Prawns

Kidneys – *Bangarus*

Malpighian tubules – Cockroach

149. Answer (4)

Hint: Monomeric proteins of thick filament

Sol.: Many monomeric proteins called meromyosins constitute one thick filament.

Each actin filament is made of two filamentous actins helically wound to each other.

Two filaments of another protein, tropomyosin, also runs close to the 'F' actins throughout its length. A complex protein troponin is distributed at regular intervals on the tropomyosin.

150. Answer (1)

Hint: Action potential

Sol.: The electrical potential difference across a depolarised membrane is called action potential or nerve impulse.

151. Answer (1)

Hint: Primary function is hormone production

Sol.: Pituitary, pineal, thyroid, adrenal, pancreas, parathyroid, thymus and gonads (testis in males and ovaries in females) are the organised endocrine bodies in our body.

152. Answer (3)

Hint: Sac-like structure

Sol.: A triangular structure called sinus venosus joins the right atrium. It receives blood through the major veins called vena cava.

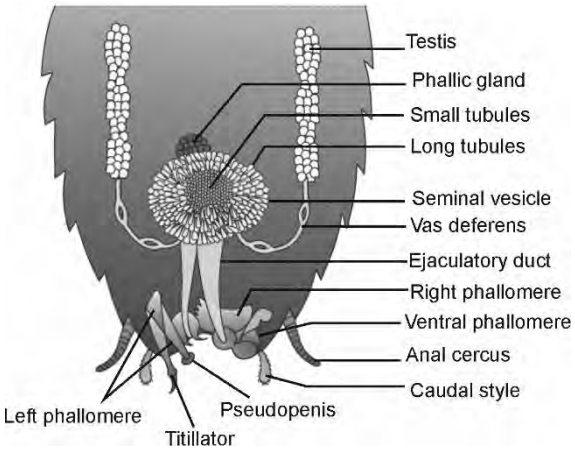
The ventricle opens into a sac-like conus arteriosus on the ventral side of the heart.

153. Answer (4)

Hint: It secretes the outermost layer of spermatophore.

Sol.: Ovaries, collaterial glands, spermathecae and vas deferens are paired structures.

Phallic gland is a single gland which is a part of male reproductive system in cockroach.



154. Answer (1)

Hint: Phylum Aschelminthes

Sol.: Pseudocoelom and unisexual nature is seen in the members of the phylum Aschelminthes.

Segmentation for the first time was seen in the members of the phylum Annelida.

Calcareous endoskeleton is seen in the members of the phylum Echinodermata.

155. Answer (4)

Hint: Site of protein synthesis

Sol.: Nissl's bodies are found in dendrites and cyton (cell bodies) only.

Synaptic vesicles contain neurotransmitters.

156. Answer (1)

Hint: The cells of this region shows excessive vacuolation.

Sol.: The cells proximal to the meristematic region undergo rapid elongation and enlargement and are responsible for the growth of the root in length. This region is called the region of elongation.

157. Answer (3)

Hint: Mango develops from monocarpellary superior ovary.

Sol.: Mango fruit is a drupe.

158. Answer (2)

Hint: Mosses are of great ecological importance.

Sol.: Mosses along with lichens are the first organisms to colonise rocks and hence, are of great ecological importance. Since mosses form dense mats on the soil, they reduce the impact of falling rain and prevent soil erosion.

159. Answer (2)

Hint: It is a gaseous phytohormone.

Sol.: Ethylene is used to initiate flowering and for synchronising fruit-set in pineapples. It also induces flowering in mango.

160. Answer (2)

Hint: Anaphase is the third stage of mitotic karyokinesis.

Sol.: In anaphase, as each daughter chromosome moves away from the equatorial plate, the centromere of the resultant chromosome remains directed towards the pole and the arms of the chromosome trailing behind.

161. Answer (2)

Hint: *Pteris* and *Selaginella* are pteridophytes.

Sol.: *Cedrus* is a gymnosperm with branched stem.

162. Answer (3)

Hint: Neem has pinnately compound leaves.

Sol.: In a pinnately compound leaf, a number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf as in neem.

163. Answer (4)

Hint: This organism is *Nostoc.*

Sol.: *Nostoc* is a cyanobacterium that can fix both atmospheric nitrogen and carbon dioxide.

164. Answer (4)

Hint: Complex IV of ETS of mitochondria is Cytochrome *c* oxidase.

Sol.: Cytochrome *c* is a small protein attached to the outer surface of the inner membrane of mitochondria and acts as a mobile carrier for transfer of electrons between complex III and IV. Complex IV refers to cytochrome *c* oxidase complex containing cytochromes *a* and a_3, and two copper centres.

165. Answer (4)

Hint: False feet are pseudopodia and are found in *Amoeba*.

Sol.: Ciliated protozoans have a cavity (gullet) that opens to the outside of the cell surface.

166. Answer (3)

Hint: Cell wall prevents the cell from bursting or collapsing.

Sol.: Slime layer protects the cell from loss of water and nutrients. Capsule allows bacterium to hide from host's immune system. Cell membrane in prokaryotes is similar structurally to that of eukaryotes.

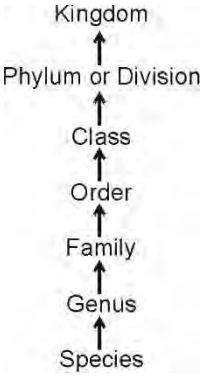
167. Answer (4)

Hint: This causative agent is an abnormally folded protein.

Sol.: The most notable diseases caused by prions are bovine spongiform encephalopathy (BSE) commonly called mad cow disease in cattle and its analogous variant Cr–Jacob disease (CJD) in humans.

168. Answer (3)

Hint: Ascending order of taxonomical categories is as follows:



Sol.: The correct ascending sequential order of taxonomical categories for a housefly is
Musca (genus) → Muscidae (family) → Diptera (order) → Insecta (class) → Arthropoda (phylum)

169. Answer (4)
Hint: Systematics takes into account evolutionary relationships between organisms.
Sol.: Phylogeny is the evolutionary relationships amongst organisms. Systematics is taxonomy along with phylogeny.

170. Answer (1)
Hint: In binomial nomenclature, the first word denoting the genus starts with a capital letter while the specific epithet starts with a small letter.
Sol.: The scientific name of wheat is *Triticum aestivum.*

171. Answer (2)
Hint: Heart failure leads to inadequate blood supply.
Sol.: Heart failure is the state of the heart when it is not pumping blood effectively enough to meet the needs of the body. Congestion of the lungs is one of the main symptoms of congestive heart failure.
Heart attack is when the heart muscle is suddenly damaged by an inadequate blood supply.

172. Answer (2)
Hint: Opens into renal pelvis
Sol.: Each nephron has two parts – the glomerulus and the renal tubule.
Glomerulus is a tuft of capillaries formed by afferent arteriole – a fine branch of renal artery. The renal tubule begins with a double walled cup-like structure called Bowman's capsule. The tubule further continues to form a highly coiled PCT. A hairpin shaped Henle's loop, is the next part of the tubule which has an ascending and a descending limb. The ascending limb continues as another highly coiled tubular region called DCT.
Collecting duct is not a part of nephron.

173. Answer (2)
Hint: This name is also given to a bacterial disease.
Sol.: Fatigue means a feeling of overtiredness. Spasms are sustained painful muscular contractions.
Muscle tonus refers to partial muscle contraction in relaxed state.

174. Answer (4)
Hint: Breakdown of glycogen
Sol.: Catecholamines stimulate the breakdown of glycogen resulting in an increased concentration of glucose in blood. Glucocorticoids stimulate gluconeogenesis, lipolysis and proteolysis, suppress immune response and produce anti-inflammatory reactions.

175. Answer (3)
Hint: Basophils constitute least percentage of total WBCs
Sol.: Angina pectoris – Acute chest pain
Basophils – 0.5-1% of the total WBCs
Eosinophils – 2-3% of the total WBCs
Cardiac arrest – Heart stops beating

176. Answer (3)
Hint: Together with 8^{th} and 9^{th} sterna, it forms brood pouch.
Sol.: The abdomen in both male and female cockroaches consists of 10 segments. In females, the 7^{th} sternum is boat shaped.

177. Answer (2)
Hint: Also called flame cells
Sol.: Protonephridia is the excretory structure in Platyhelminthes, rotifers, some annelids and cephalochordate–*Amphioxus*.

178. Answer (2)
Hint: Member of the phylum Mollusca
Sol.:

Balanoglossus	–	Stomochord in collar region
Sepia (Cuttlefish)	–	Feather-like gills in mantle cavity
Laccifer	–	Lac insect is an economically important insect
Hirudinaria	–	Blood sucking leech
Nereis	–	Parapodia, lateral appendages help in swimming

179. Answer (3)
Hint: Function of medulla oblongata
Sol.: Hypothalamus contains centres which control body temperature, urge for eating and drinking.
Medulla oblongata controls gastric secretions.

180. Answer (1)
Hint: FRC is functional residual capacity
Sol.: FRC is the volume of air that will remain in the lungs after a normal expiration. Since, RV remains in lungs even after a forcible expiration, thus FRC cannot be measured with a simple spirometer.

❑ ❑ ❑

All India Aakash Test Series for NEET - 2026

TEST - 7 (Code-D)

Click here for Code-C sol.

Test Date : 30/03/2025

ANSWERS

1. (2)	37. (1)	73. (2)	109. (1)	145. (2)
2. (1)	38. (3)	74. (3)	110. (2)	146. (4)
3. (3)	39. (4)	75. (4)	111. (2)	147. (4)
4. (2)	40. (2)	76. (2)	112. (2)	148. (2)
5. (3)	41. (2)	77. (1)	113. (2)	149. (3)
6. (2)	42. (1)	78. (4)	114. (4)	150. (2)
7. (1)	43. (3)	79. (2)	115. (3)	151. (2)
8. (4)	44. (2)	80. (2)	116. (3)	152. (4)
9. (3)	45 (2)	81. (3)	117. (4)	153. (4)
10. (2)	46. (3)	82. (3)	118. (2)	154. (3)
11. (1)	47. (1)	83. (2)	119. (3)	155. (3)
12. (2)	48. (3)	84. (4)	120. (2)	156. (1)
13. (1)	49. (1)	85. (4)	121. (2)	157. (4)
14. (4)	50. (4)	86. (1)	122. (4)	158. (3)
15. (2)	51. (3)	87. (4)	123. (4)	159. (4)
16. (2)	52. (1)	88. (3)	124. (1)	160. (3)
17. (3)	53. (2)	89. (3)	125. (4)	161. (4)
18. (3)	54. (4)	90. (2)	126. (3)	162. (4)
19. (3)	55. (3)	91. (3)	127. (2)	163. (4)
20. (4)	56. (2)	92. (1)	128. (1)	164. (3)
21. (2)	57. (2)	93. (3)	129. (4)	165. (2)
22. (2)	58. (2)	94. (1)	130. (1)	166. (2)
23. (1)	59. (3)	95. (2)	131. (4)	167. (2)
24. (1)	60. (3)	96. (1)	132. (1)	168. (2)
25. (2)	61. (1)	97. (3)	133. (4)	169. (3)
26. (2)	62. (4)	98. (2)	134. (3)	170. (1)
27. (1)	63. (2)	99. (1)	135. (1)	171. (1)
28. (2)	64. (1)	100. (1)	136. (1)	172. (3)
29. (3)	65. (4)	101. (4)	137. (4)	173. (2)
30. (2)	66. (2)	102. (1)	138. (4)	174. (2)
31. (4)	67. (3)	103. (1)	139. (1)	175. (3)
32. (2)	68. (1)	104. (3)	140. (4)	176. (3)
33. (2)	69. (3)	105. (3)	141. (1)	177. (4)
34. (3)	70. (3)	106. (3)	142. (1)	178. (2)
35. (4)	71. (1)	107. (2)	143. (3)	179. (2)
36. (1)	72. (3)	108. (2)	144. (3)	180. (2)

HINTS & SOLUTIONS

[PHYSICS]

1. Answer (2)

Hint & Sol.: $v = \frac{D}{t} = \frac{200}{20} = 10 \text{ m s}^{-1}$

$$\frac{\Delta v}{v} = \pm\left(\frac{\Delta D}{D} + \frac{\Delta t}{t}\right)$$

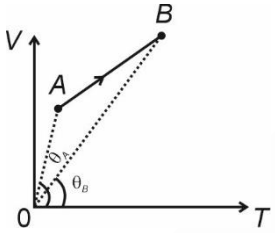
$$\Delta v = \pm v\left[\frac{4}{200} + \frac{0.2}{20}\right]$$

$$\Delta v = \pm\left[\frac{4}{20} + \frac{0.2}{2}\right] = \pm[0.2 + 0.1] = \pm 0.3$$

2. Answer (1)

Hint: Use slope of straight line

Sol.:



$$\frac{V}{T} \propto \frac{1}{P}$$

$$\left(\frac{V}{T}\right)_A > \left(\frac{V}{T}\right)_B$$

$$\frac{1}{P_A} > \frac{1}{P_B}$$

So $P_B > P_A$

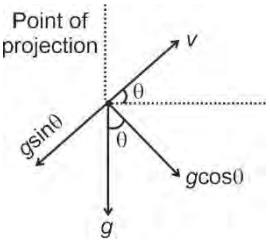
3. Answer (3)

Hint & Sol.: At the point of return, body stops instantaneously and then changes its direction of motion. Acceleration is constant so it does not change its direction.

4. Answer (2)

Hint: Rate of change of speed is tangential acceleration.

Sol.:



5. Answer (3)

Hint: At maximum extension the friction force reaches limiting value.

Sol.: From energy conservation:

$$2gx = \frac{1}{2}kx^2$$

$$x = \frac{4g}{k}$$

At maximum extension

$kx = \mu \times 10 \times g$

$4g = \mu \times 10 \times g$

$$\mu = \frac{4}{10} = 0.4$$

6. Answer (2)

Hint: Set of equal and opposite force acting on a body on different lines of action is called couple.

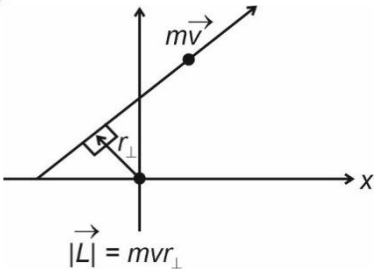
Sol.: $\vec{F}_1 + \vec{F}_2 = 0$

$$\vec{F}_1 \times \vec{r}_1 + \vec{F}_2 \times \vec{r}_2 \neq 0$$

7. Answer (1)

Hint: Use $L = mvr\sin\theta = mvr_\perp$

Sol.:



For constant velocity, $r_\perp$ remains constant so angular momentum is constant.

8. Answer (4)

Hint & Sol.: The gravitational potential is $\frac{-3}{2}\frac{GM}{R}$ at centre and zero at infinity.

9. Answer (3)

Hint: $\frac{\text{Strain}}{\text{Stress}} = \frac{1}{Y}$

Sol.: $Y = \frac{T}{A}\frac{L}{\Delta L}$

$\frac{\Delta L}{T} = \frac{L}{AY} = \tan\theta$

For the given condition $\tan\theta \propto \frac{1}{A}$

$\tan\theta_A > \tan\theta_B > \tan\theta_C$

$A_A < A_B < A_C$

Wire C is thickest wire.

10. Answer (2)

Hint & Sol.: The working of venturimeter is based on Bernoulli's theorem.

11. Answer (1)

Hint: Heat current = $\frac{kA(T_1 - T_2)}{L}$

Sol.: $Q_1 = \frac{k(T_1 - T_2)A}{L}$

$Q_2 = \frac{k(T_1 - T_2)4A}{2L}$

$Q_2 = 2Q_1 = 2Q$

12. Answer (2)

Hint: $\Delta U = nC_V\Delta T$

Sol.: $\Delta Q = nC_P\Delta T = \frac{5}{2}nR\Delta T$

$3Q = 5\left(\frac{3}{2}nR\Delta T\right) \Rightarrow \frac{3}{5}Q = \Delta U$

13. Answer (1)

Hint: Use $v = \omega\sqrt{A^2 - x^2}$

Sol.: $v = \omega\sqrt{A^2 - x^2}$

$A\omega = v_{max}$

$4\omega = 4 \Rightarrow \omega = 1$ rad s^{-1}

$v = 1\sqrt{4^2 - x^2}$

$2^2 = 4^2 - x^2$

$x^2 = 16 - 4$

$x^2 = 12$

$x = 2\sqrt{3}$ cm

14. Answer (4)

Hint: Intensity $\propto A^2$ and $\frac{I_{max}}{I_{min}} = \left(\frac{A_1 + A_2}{A_1 - A_2}\right)^2$

Sol.: $f_1 = 300$ Hz and $f_2 = 304$ Hz

$\Delta f = 4$ Hz

$\frac{I_{max}}{I_{min}} = \left(\frac{4+3}{4-3}\right)^2 = \frac{49}{1}$

15. Answer (2)

Hint: Breaking stress is the maximum stress that cable can bear.

Sol.: $\sigma = \frac{m(g+a)4}{\pi d^2} \Rightarrow d = \left[\frac{4\,m(g+a)}{\pi\sigma}\right]^{\frac{1}{2}}$

16. Answer (2)

Hint & Sol.: $C_p - C_v = R$ is true for any ideal gas. A polyatomic molecule will have three translational degree of freedom.

$< v >= \sqrt{\frac{8RT}{\pi M}} \Rightarrow < v >^2 = \frac{8RT}{\pi M}$

$< v^2 > = \frac{3RT}{M}$

17. Answer (3)

Hint: Frequency of sound wave remains constant in different medium.

Sol.: $v = \lambda f \Rightarrow f = \frac{v}{\lambda} =$ constant

$\frac{3500}{\lambda} = 500 \Rightarrow \lambda = 7$ m

$\lambda = 700$ cm

18. Answer (3)

Hint: The general equation of harmonic wave travelling along negative x-axis is given by

$y = A\sin(kx + \omega t)$

Sol.: $y = 2\sin\left(\frac{2\pi}{\frac{\pi}{2}}x + 2\pi \times \frac{1}{\pi}t\right)$

$y = 2\sin(4x + 2t)$

19. Answer (3)

Hint: Time period of simple pendulum of $T = 2\pi\sqrt{\frac{l}{g}}$

Sol.: $g' = \frac{GM}{(R + R/2)^2} = \frac{4}{9}\frac{GM}{R^2} = \frac{4}{9}g$

$\frac{T_2}{T_1} = \sqrt{\frac{g_1}{g_2}} = \sqrt{\frac{g}{\frac{4}{9}g}}$

$\frac{T_2}{T_1} = \sqrt{\frac{9}{4}} = \frac{3}{2}$

20. Answer (4)

Hint: Use equation of velocity and acceleration

Sol.: $a = -\omega^2 A \sin\omega t$

$v = \omega A \cos\omega t$

$$\sin^2(\omega t) + \cos^2(\omega t) = \frac{a^2}{\omega^4 A^2} + \frac{v^2}{\omega^2 A^2}$$

$$1 = \frac{a^2}{\omega^4 A^2} + \frac{v^2}{\omega^2 A^2}$$

21. Answer (2)

Hint: Use $v_{max} = A\omega$

Sol.: $T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2}{100}} = \frac{\pi\sqrt{2}}{5}$ s

$v_{max} = A\omega$

$$= 0.4 \times \frac{2\pi}{T} \Rightarrow \frac{0.4 \times 2\pi \times 5}{\pi\sqrt{2}}$$

$$v_{max} = \frac{4\sqrt{2}}{2} = 2\sqrt{2} \text{ m/s}$$

22. Answer (2)

Hint: Change in internal energy $\Delta U = n C_V \Delta T$

Sol.: $\Delta W = -\Delta U$

$= -n C_V \Delta T$

$$= -n\frac{5}{2}R(300) = -750\, nR$$

23. Answer (1)

Hint: Use Newton's law of cooling

Sol.: Rate of cooling will increase as the difference of temperature of body and ambient temperature increases.

24. Answer (1)

Hint: Radiation power (P) = $\sigma \cdot e\, AT^4$

Sol.: $\frac{E_2}{E_1} = \left(\frac{T_2}{T_1}\right)^4$

T_1 = (273 + 327) K

= 600 K

T_2 = 600 K + 600 K = 1200 K

$$\left(\frac{E_2}{E_1}\right) = \left(\frac{1200}{600}\right)^4$$

$E_2 = 16E$

25. Answer (2)

Hint: Viscous force is directly proportional to speed.

Sol.: $a = \frac{mg - F_B - F_v}{m} = \frac{mg - \rho Vg - 6\pi\eta rv}{m}$

At velocity greater than terminal velocity, viscous force provides deceleration till terminal velocity is achieved.

26. Answer (2)

Hint & Sol.: There is no effect of variation in acceleration on the volume displaced.

27. Answer (1)

Hint: Use $\Delta l = \frac{Fl}{AY}$

Sol.: $\Delta l = \frac{Fl}{A.Y} = \frac{F}{\pi r^2}\frac{l}{Y}$

$$\frac{\Delta l_2}{\Delta l_1} = \left(\frac{r_1}{r_2}\right)^2 = \frac{1}{4}$$

$$\Delta l_2 = \frac{1}{4} \times \Delta l_1$$

$$\Delta l_2 = \frac{1}{4} \times 4 = 1\,\text{mm}$$

28. Answer (2)

Hint: Angular impulse = change in angular momentum

Sol.: $[\Delta l] = [mvr]$

$= [ML^2T^{-1}]$

29. Answer (3)

Hint & Sol.: If a body is projected with escape speed then only its kinetic energy at far away point is zero and for a bounded system the force is always attractive and total energy is negative.

30. Answer (2)

Hint & Sol.:

(i) Kepler's first law is law of orbit

(ii) Kepler's second law is law of area

(iii) Kepler's third law is law of periods

31. Answer (4)

Hint: Use, $g' = \frac{GM}{(R+h)^2}$

Sol.: $g' = \frac{GM}{(R+h)^2}$

$$\frac{3}{4}\frac{GM}{R^2} = \frac{GM}{(R+h)^2}$$

$$\sqrt{\frac{4}{3}}R = R + h$$

$$h = \left(\frac{2}{\sqrt{3}} - 1\right)R$$

32. Answer (2)

Hint: Rotational kinetic energy $= \frac{1}{2} I\omega^2$

Sol.: K·E = $\frac{1}{2}\frac{MR^2}{2}\omega^2$

$K\cdot E = \frac{1}{2}\times 10\times\left(\frac{20}{100}\right)^2\times\frac{1}{2}\times(7\times 2\pi)^2$

$= \frac{1}{4}\times 10\times\frac{1}{25}\times\left(7\times 2\times\frac{22}{7}\right)^2$

$= \frac{10}{100}\times 44\times 44$

= 193.6 J

33. Answer (2)

Hint: Use parallel axis theorem $I_{AA'} = I + Md^2$

Sol.: $Mk^2 = \frac{MR^2}{4} + \frac{MR^2}{4}$

$Mk^2 = \frac{2}{4}MR^2$

$k = \frac{R}{\sqrt{2}}$

34. Answer (3)

Hint & Sol.: Adding water will first shift COM downward and when it is completely filled, then COM again shifts to centre.

35. Answer (4)

Hint & Sol.: The particle will move in uniform circular motion. In uniform circular motion both acceleration and velocity are variable.

36. Answer (1)

Hint: Use work energy theorem

Sol.: $\frac{1}{2}mv^2 = mgh - \mu mg\cos\theta L$

$\frac{1}{2}mv^2 = mgh - \frac{1}{2}mg\frac{h}{\sin\theta}\cos\theta$

$\frac{1}{2}mv^2 = mgh - \frac{mgh}{2}\cot 45^\circ$

$\frac{1}{2}mv^2 = \frac{mgh}{2}$

$v = \sqrt{gh}$

37. Answer (1)

Hint: Use conservation of linear momentum

Sol.: $KE = \frac{P^2}{2M}$

$= \frac{m^2v^2}{2\times\frac{2}{3}m} = \frac{3}{4}mv^2$

38. Answer (3)

Hint: Normal reaction will be responsible for providing centripetal acceleration.

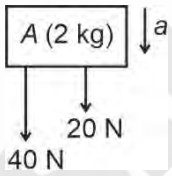
Sol.: $N - Mg = \frac{Mv^2}{R}$

$N = Mg + \frac{Mv^2}{R}$

39. Answer (4)

Hint: The spring force does not change immediately.

Sol.:



$F_{net} = ma$

$60 = 2a$

$a = 30\ m\ s^{-2}$

40. Answer (2)

Hint: Velocity of particle after time t is $u\cos\theta\,\hat{i} + (u\sin\theta - gt)\hat{j}$

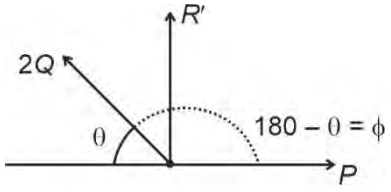
Sol.: The initial velocity is $10\hat{i} + 20\hat{j}$

$R = \frac{2u_xu_y}{g} = \frac{2\times 10\times 20}{10}$ = 40 m

41. Answer (2)

Hint: Horizontal component of both the vector should cancel each other on doubling Q.

Sol.:



As $\vec{R}'$ is perpendicular to $\vec{P}$. So

$2Q\cos\theta = P$

$\cos\theta = \frac{P}{2Q} = \frac{1}{2} \Rightarrow \theta = 60^\circ$

$\phi = 180^\circ - 60^\circ = 120^\circ$

42. Answer (1)

Hint: $\Delta v = \int a\,dt$ = area under acceleration-time graph.

Sol.: Δv = area under $a - t$ graph

$= \left(\frac{1}{2}\right)(8+4)\times 2$

$v_f - v_{in} = 12\ \text{m s}^{-1}$

$v_{in} = 0$, given

$v_f = 12\ \text{m s}^{-1}$

43. Answer (3)

Hint: Use displacement travelled in n^{th} second formula to find speed of projection.

Sol.: $5 = u - \frac{10}{2}(8-1)$

$5 = u - 35$

$u = 40\ \text{m s}^{-1}$

$h = \frac{u^2}{2g} = \frac{40\times 40}{2\times 10} = 80\ \text{m}$

44. Answer (2)

Hint: L.C = 1 MSD – 1 VSD

Sol.: 1 MSD is equal to 1 mm

$\text{LC} = \text{MSD}\left(1 - \frac{15}{20}\right) = \frac{5\,\text{MSD}}{20}$

$= \frac{1}{4}\times 1\,\text{mm} = 0.25\ \text{mm}$

45 Answer (2)

Hint: Use $[v] = [a] = [bt] = [ct^2]$

Sol.: $\left[\frac{ab}{c^2}\right] = \left|\frac{(v)(v/t)}{(v)^2\times\frac{1}{t^4}}\right| = \left[t^3\right]$

$\left[\frac{ab}{c^2t^3}\right] = [M^0L^0T^0]$

[CHEMISTRY]

46. Answer (3)

Hint: Internal energy is an extensive property.

Sol.: Molar heat capacity is an intensive property.

47. Answer (1)

Hint: $\text{pH} = \text{p}K_a + \log\frac{[\text{Salt}]}{[\text{Acid}]}$

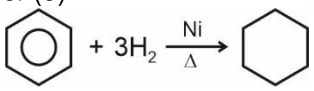
Sol.: $4.8 = 4.8 + \log\frac{[\text{Salt}]}{[\text{Acid}]}$

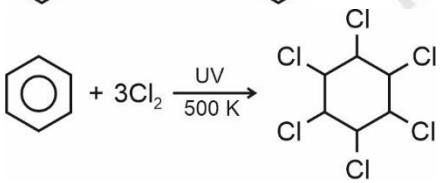
$\log\frac{[\text{Salt}]}{[\text{Acid}]} = 0$

$\frac{[\text{Salt}]}{[\text{Acid}]} = 1$

So, $[CH_3COONa] = [CH_3COOH] = 0.1$

48. Answer (3)

Hint: 

Sol.: 

49. Answer (1)

Hint: PbS is black colour

Sol.: $[Fe(CN)_5NOS]^{4-} \rightarrow$ Violet

$[Fe(SCN)]^{2+} \rightarrow$ Blood red

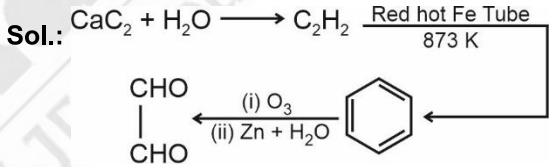
$Fe_4[Fe(CN)_6]_3 \cdot xH_2O \rightarrow$ Prussian blue

50. Answer (4)

Hint & Sol.: Aniline is separated from aniline water mixture by steam distillation.

51. Answer (3)

Hint: $CaC_2 + H_2O \rightarrow Ca(OH)_2 + C_2H_2$

Sol.: 

52. Answer (1)

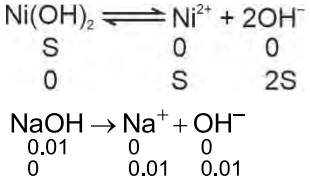
Hint & Sol.: H_3BO_3 is monobasic acid

$H_3BO_3 + 2H_2O \rightleftharpoons B(OH)_4^- + H^+$

53. Answer (2)

Hint: K_{sp} of $Ni(OH)_2 = [Ni^{2+}][OH^-]^2$

Sol.: Let the solubility be S



$K_{Sp} = [Ni^{2+}]\,[OH^-]^2$

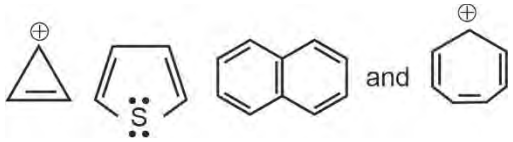
$[OH^-] = 2S + 0.01 \simeq 0.01]$

$2 \times 10^{-15} = S \times (0.01)^2$

$S = \frac{2\times 10^{-15}}{10^{-4}} = 2\times 10^{-11}\ \text{M}$

54. Answer (4)

Hint : Cyclic planar species having $(4n + 2)\pi$ electrons in conjugation are aromatic in nature. (n = 0, 1, 2…)

Sol.:  and

are aromatic in nature

 and  are antiaromatic species

55. Answer (3)

Hint: Bond order = $\frac{1}{2}(N_b - N_a)$

Sol.: Bond order of $N_2 = \frac{1}{2}(10-4) = 3$

Bond order of $N_2^+ = \frac{1}{2}(9-4) = 2.5$

Bond order of $O_2 = \frac{1}{2}(10-6) = 2$

Bond order of $O_2^- = \frac{1}{2}(10-7) = 1.5$

56. Answer (2)

Hint: Kinetic energy = $h(\nu - \nu_0)$

Sol.: KE = $6.626 \times 10^{-34}\ (1 \times 10^{15} - 1 \times 10^{14})$

$= 6.626 \times 10^{-34}\ (10 - 1) \times 10^{14}$

$= 6.626 \times 10^{-34} \times 9 \times 10^{14}$ J

$= 59.634 \times 10^{-20} = 5.96 \times 10^{-19}$ J

57. Answer (2)

Hint: For a given value of n,

l = 0, 1, ... (n –1)

Sol.: For given value of l

m = –l ....0.... +l

so if l = 1, m = –1, 0, +1

therefore option (2) is not possible.

58. Answer (2)

Hint: mmol of HNO_3 required = 800 × 3 = 2400

Sol.: Mass of $HNO_3 = 2400 \times 10^{-3} \times 63 = 151.2$ g

70 g of HNO_3 is present in 100 g of concentrated solution

Mass of concentrated HNO_3 required =

$\frac{100 \times 151.2}{70} = 216$ g

59. Answer (3)

Hint & Sol.: Buckminsterfullerene contains twenty six-membered rings and twelve five-membered rings.

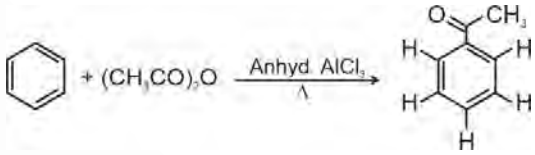
60. Answer (3)

Hint & Sol.:

$$2CH_3CH_3 + 3O_2 \xrightarrow[\Delta]{(CH_3COO)_2Mn} 2CH_3COOH + 2H_2O$$

61. Answer (1)

Hint: It is Friedel-Crafts acylation reaction



Sol.:

Number of σ bonds = 17

Number of π bonds = 4

62. Answer (4)

Hint: Tropone is a non-benzenoid aromatic compound.

Sol.: Hyperconjugation is delocalisation of σ electrons of C–H bond of an alkyl group directly attached to an atom of unsaturated system or to an atom with unshared *p* orbital.

63. Answer (2)

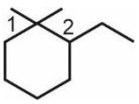
Hint: Percentage of halogen = $\frac{\text{Atomic mass of X} \times \text{Given mass of AgX} \times 100}{\text{molecular mass of AgX} \times \text{Mass of organic compound}}$

Sol.: Percentage of Br = $\frac{80 \times 0.12 \times 100}{188 \times 0.30}$

= 17.02%

64. Answer (1)

Hint & Sol:



IUPAC name:

2-Ethyl-1, 1-dimethylcyclohexane.

65. Answer (4)

Hint: Higher the standard electrode potential higher is the oxidising power of halogen.

Sol.: $F_2 > Cl_2 > Br_2 > I_2$ as per decreasing order of standard electrode potential values.

66. Answer (2)

Hint: $CH_4 + 2O_2 \xrightarrow{\Delta} CO_2 + 2H_2O$;Combination reaction

Sol.: $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$; Decomposition reaction

$Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$; Displacement reaction

$Cl_2 + 2OH^- \longrightarrow ClO^- + Cl^- + H_2O$; Disproportionation reaction

67. Answer (3)

Hint & Sol.: Balanced equation is

$Cr_2O_7^{2-} + 3SO_3^{2-} + 8H^+ \rightarrow 2Cr^{3+} + 3SO_4^{2-} + 4H_2O$

68. Answer (1)

Hint & Sol.: $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{2-}$ is not exist because

(i) Six large Cl^- ions cannot be accommodated around Si^{4+} due to limitation of its size.

(ii) Interaction between lone pair of Cl^- ion and Si^{4+} is not very strong.

69. Answer (3)

Hint: Gallium has least melting point among group 13 elements.

Sol.: The electronegativity order of group 13 elements is B > Tl > In > Ga > Al.

70. Answer (3)

Hint: Sn in +4 oxidation state is more stable so it acts as reducing agent in +2 oxidation state.

Sol.: Pb compounds in +2 oxidation state are stable.

71. Answer (1)

Hint: Acidic strength of hydrides of 2nd period elements depends upon bond polarity.

Sol.: As the electronegativity of element increases, bond polarity increases, the strength of the acid increases.

72. Answer (3)

Hint: $K_a \times K_b = 10^{-14}$ at 298 K

Sol.: $K_a = \frac{10^{-14}}{K_b}$

$= \frac{10^{-14}}{4.27 \times 10^{-10}} = 0.234 \times 10^{-4} = 2.34 \times 10^{-5}$

73. Answer (2)

Hint: If a reaction is multiplied by n, $K' = (K)^n$

Sol.: $2SO_2 + O_2 \rightleftharpoons 2SO_3$, K_1 ....(1)

$SO_3 + H_2SO_4 \rightleftharpoons H_2S_2O_7$, K_2 .... (2)

$H_2S_2O_7 + H_2O \rightleftharpoons 2H_2SO_4$, K_3 .... (3)

On applying (1) + 2 × (2) + 2 × (3) we get,

$2SO_2 + O_2 + 2H_2O \rightleftharpoons 2H_2SO_4$

So, $K = K_1 \times K_2^2 \times K_3^2$

74. Answer (3)

Hint: One H^+ is added in the species to get conjugate acid.

Sol.: $H^+ + HSO_4^- \rightarrow H_2SO_4$

75. Answer (4)

Hint: $\Delta_rH = \Delta_fH(\text{product}) - \Delta_f(\text{reactant})$

Sol.: $\Delta_rH = \Delta_fH\ CO_2(g) - \Delta_fH\ CO(g)$

$= -393.51 - (-110.53)$

$= -393.51 + 110.53$

$= -282.98\ kJ\ mol^{-1}$

76. Answer (2)

Hint: The process is adiabatic, hence q = 0

Sol.: $\Delta U = q + w$

$\Delta U = w \quad (\because q = 0)$

$w = -P\Delta V$

$= -4 \times (6.75 - 1.25)$

$w = -22\ L\ atm$

$w = -22 \times 101.3$

$w = -2.23\ kJ = \Delta U$

77. Answer (1)

Hint & Sol: ΔS_{total} is not zero irreversible expansion of an ideal gas under isothermal condition.

78. Answer (4)

Hint: Dipole moment is a vector quantity whose value depends on shape and bond moment of the molecules.

Sol.: CH_4, BF_3, CO_2, SO_3 have zero dipole moment.

79. Answer (2)

Hint: During hybridisation, the orbitals present in valence shell having almost equal energy are hybridised.

Sol.: Filled orbitals of valence shell take part in hybridisation in some cases.

80. Answer (2)

Hint: Pt in $[PtCl_4]^{2-}$ is dsp^2 hybridised

Sol.: $NH_3 \rightarrow sp^3$

$PCl_5 \rightarrow sp^3d$

$BrF_5 \rightarrow sp^3d^2$

81. Answer (3)

Hint: As the number of bonds increases bond lengths decreases.

Sol.:

Species	Bond lengths (pm)
F – F	144
O = O	121
N ≡ N	109

82. Answer (3)

Hint: Statement I is Pauli's exclusion principle.

Sol.: In the ground state of the atoms the orbitals are filled in order of their increasing energies.

83. Answer (2)

Hint: $\lambda = \frac{h}{mv}$

Sol.: $m = \frac{h}{\lambda v}$

$= \frac{6.626 \times 10^{-34}}{3.313 \times 10^{-10} \times 3 \times 10^{8}}$

$= 0.667 \times 10^{-32}$

$= 6.67 \times 10^{-33}$ kg

84. Answer (4)

Hint: Lyman series gives spectral lines in UV region

Sol.: Balmer series gives spectral lines in visible region.

85. Answer (4)

Hint: Number of angular nodes = l

Sol.:

Orbitals	Number of angular nodes
1*s*	0
2*p*	1
4*d*	2
4*f*	3

86. Answer (1)

Hint: Molarity = $\frac{\text{no. of moles of solute}}{\text{volume of solution in L}}$

Sol.: Number. of moles of methanol required = M × V

= 0.3 × 3 = 0.9

Mass of methanol required = moles × molar mass

= 0.9 × 32 = 28.8 g

Volume of methanol

$= \frac{\text{mass}}{\text{density}} = \frac{28.8}{0.793} = 36.32$ mL

87. Answer (4)

Hint: Number of moles = $\frac{\text{Given mass}}{\text{molar mass}}$

Sol.: Number of atoms in 1 g C $= \frac{1}{12} N_A$

Number of atoms in 1 g $O_2 = 2 \times \frac{1}{32} N_A = \frac{1}{16} N_A$

Number of atoms in 1 g $N_2 = 2 \times \frac{1}{28} N_A = \frac{1}{14} N_A$

Number of atoms in 1 g $H_2 = 2 \times \frac{1}{2} N_A = N_A$

88. Answer (3)

Hint & Sol.:

	%	Mole	Mole Ratio
C	80	80/12 = 6.66	6.66/6.66 = 1
H	20	20/1 = 20	20/6.66 ≃ 3

Empirical formula = CH_3

89. Answer (3)

Hint: On moving left to right the ionisation enthalpy generally increases.

Sol.:

Element	Ionisation enthalpy (kJ/mol)
Li	520
Be	899
B	801
C	1086
N	1402
O	1314
F	1681
Ne	2080

90. Answer (2)

Hint: The normal oxide formed by the element on extreme left is most basic, whereas that formed by the element on extreme right of periodic table is the most acidic.

Sol.: $Cl_2O_7 \rightarrow$ Acidic

$As_2O_3 \rightarrow$ Amphoteric

$N_2O \rightarrow$ Neutral

$Na_2O \rightarrow$ Basic

[BIOLOGY]

91. Answer (3)
Hint: Both *Pinus* and *Cycas* belong to gymnosperms.
Sol.: As both are gymnosperms, they are heterosporous in nature.

92. Answer (1)
Hint: Gas required for aerobic respiration is released during light reaction of photosynthesis.
Sol.: CO_2 fixation takes place during dark reaction. ATP, NADPH + H^+ and O_2 are the products of light reaction of photosynthesis.

93. Answer (3)
Hint: This scientist also showed that sunlight is essential to the plant process.
Sol.: Jan Ingenhousz showed that it is only the green part of the plants that could release oxygen.

94. Answer (1)
Hint: Non-cyclic photophosphorylation involves both PS-I and PS-II.
Sol.: Non-cyclic photophosphorylation requires water as an external electron donor.

95. Answer (2)
Hint: Maize is a C_4 plant and tomato is a C_3 plant.
Sol.: In Maize, 5 ATPs and 2 $NADPH_2$ are used for the fixation of one CO_2 molecule. Photorespiration does not take place in C_4 plants. They show CO_2 saturation at about 360 µl L^{-1} and do not show increase in photosynthesis at low light intensities.

96. Answer (1)
Hint: Lower the taxa, more are the characteristics that the members within the taxon share.
Sol.: Members of the same species will have the highest number of common characteristics.

97. Answer (3)
Hint: Tripalmitin is a fatty acid molecule.
Sol.: RQ of tripalmitin is 0.7.

98. Answer (2)
Hint: This ion acts as a cofactor for various enzymes.
Sol.:

$$\text{Pyruvic acid} + \text{CoA} + \text{NAD}^+ \xrightarrow[\text{Pyruvate dehydrogenase}]{Mg^{2+}} \text{Acetyl CoA} + CO_2 + \text{NADH} + H^+$$

99. Answer (1)
Hint: Fats would need to be broken down into glycerol and fatty acids first.
Sol.: Glycerol would enter the pathway after being converted to PGAL. In both lactic acid and alcohol fermentation, not much energy is released; less than seven per cent of the energy in glucose is released and not all of it is trapped as high energy bonds of ATP.

100. Answer (1)
Hint: Methanogens are archaebacteria.
Sol.: Archaebacteria differ from other bacteria in having a different cell wall structure and this feature is responsible for their survival in extreme conditions. Methanogens are present in the gut of several ruminant animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals.

101. Answer (4)
Hint: Phosphofructokinase is the pacemaker enzyme of glycolysis.
Sol.: Phosphofructokinase catalyses conversion of fructose-6-phosphate to fructose-1, 6-bisphosphate. Citrate synthase catalyses conversion of Acetyl CoA and OAA to 6C organic acid, citric acid. Pyruvic acid decarboxylase catalyses the conversion of pyruvic acid to acetaldehyde. Invertase catalyses the conversion of sucrose to glucose and fructose.

102. Answer (1)
Hint: E. Kurosawa reported the appearance of symptoms of the disease in the rice seedlings when they were treated with sterile filtrate of the fungus.
Sol.: Auxin was isolated by F.W. Went from tips of coleoptiles of oat seedlings.

103. Answer (1)
Hint: This hormone promotes cell division.
Sol.: Cytokinins help to overcome the apical dominance that occurs due to auxin.

104. Answer (3)
Hint: r is the relative growth rate in the exponential growth of an organism.
Sol.: The exponential growth can be expressed as $W_1 = W_0 e^{rt}$. Here, r is the relative growth rate and is also the measure of the ability of the plant to produce new plant material, referred to as efficiency index.

105. Answer (3)

Hint: Pteridophytes have much more differentiated plant body than the bryophytes.

Sol.: In pteridophytes, the main plant body is a sporophyte which is differentiated into true roots, stems and leaves. In some cases, sporophylls may form distinct compact structures called strobili or cones.

106. Answer (3)

Hint: Compound epithelium

Sol.: Lining of stomach and intestine possesses simple columnar epithelium which helps in secretion and absorption.

Inner lining of ducts of salivary glands is multi-layered and thus has a limited role in secretion and absorption. Their main function is to provide protection from chemical and mechanical stresses.

107. Answer (2)

Hint: Storage polysaccharide in plants

Sol.: Glucose is a monosaccharide.

Cellulose does not contain complex helices and hence cannot hold I_2.

Glycogen gives reddish-brown colour with iodine.

Starch can hold I_2 molecules in the helical portion and gives blue colour.

108. Answer (2)

Hint: Tidal volume × number of breaths/min

Sol.: Volume of air inspired or expired during a normal respiration is tidal volume. It is approx. 500 mL *i.e.*, a healthy man can inspire or expire approximately 6000 to 8000 mL of air per minute.

Inspiratory Reserve Volume = 2500 to 3000 mL

Expiratory Reserve Volume = 1000 to 1100 mL

109. Answer (1)

Hint: pCO_2 in systemic artery = 40 mm Hg

Sol.:

Respiratory Gas	Atmospheric Air	Alveoli	Blood (Deoxy-genated)	Blood (Oxygenated)	Tissues
O_2	159	104	40	95	40
CO_2	0.3	40	45	40	45

110. Answer (2)

Hint: Universal recipients

Sol.:

Blood Group	Antigens on RBCs	Antibodies in Plasma	Donor's Group
A	A	anti-B	A, O
B	B	anti-A	B, O
AB	A, B	Nil	AB, A, B, O
O	Nil	anti-A, B	O

111. Answer (2)

Hint: It alters carbohydrate metabolism.

Sol.: Addison's disease – Hyposecretion of adrenal cortex hormones leading to fatigue and acute weakness. Catecholamines are secreted from adrenal medulla.

Prolonged hyperglycemia leads to a complex disorder called diabetes mellitus which is associated with loss of glucose through urine and formation of harmful compounds known as ketone bodies.

112. Answer (2)

Hint: Identify a cephalochordate and a urochordate respectively.

Sol.: 'X' is *Amphioxus* or lancelet and in it, notochord extends from head to tail region and is persistent throughout life.

'Y' is *Salpa* in which, notochord is present only in larval tail.

Petromyzon (Lamprey) and hagfish belong to the class Cyclostomata.

113. Answer (2)

Hint: Terrestrial adaptations were acquired to conserve water.

Sol.: Terrestrial adaptions necessitated the production of lesser toxic nitrogenous wastes like urea and uric acid for conservation of water.

Increasing order of toxicity of nitrogenous wastes: Uric acid < Urea < Ammonia.

114. Answer (4)

Hint: Phylum Coelenterata

Sol.: Presence of cnidoblasts or cnidocytes is a feature of cnidarians. Cnidoblasts are used for anchorage, defense and for capture of prey.

115. Answer (3)

Hint: Each limb has 30 bones.

Sol.:

Total number of vertebrae	26
Total number of ribs	12 pairs = 24 ribs
Sum total of cranial and facial bones	8 + 14 = 22 bones
Sum total of phalanges in both hands	14 + 14 = 28 bones

116. Answer (3)

Hint: Floridean starch is found in red algae.

Sol.: Floridean starch as stored food material is found in *Polysiphonia.*

117. Answer (4)

Hint: Flowers of mustard and China rose are actinomorphic and phyllotaxy is alternate.

Sol.: Mustard shows parietal placentation while China rose shows axile placentation.

118. Answer (2)

Hint: Chilli belongs to Solanaceae family.

Sol.: Chilli shows valvate aestivation, bilocular ovary, actinomorphic flowers, persistent calyx, epipetalous stamen and endospermous seeds.

119. Answer (3)

Hint: The outermost layer of a dicot root is epiblema.

Sol.: In dicot roots, the tangential as well as radial walls of the endodermal cells have a deposition of water-impermeable, waxy material suberin in the form of casparian strips.

120. Answer (2)

Hint: Steler region of roots and stems also has ground tissues.

Sol.: All tissues on the innerside of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

121. Answer (2)

Hint: In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells.

Sol.: When the bulliform cells in the leaves have absorbed water and are turgid, the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inwards to minimise water loss.

122. Answer (4)

Hint: Name of the family generally ends with 'eae'.

Sol.: Convolvulaceae is a family.

123. Answer (4)

Hint: The telocentric chromosome has a terminal centromere.

Sol.: In case of acrocentric chromosome the centromere is situated close to its one end, forming one extremely short and one very long arm.

124. Answer (1)

Hint: Storage of biomolecules is performed by leucoplasts.

Sol.: Amyloplasts store carbohydrates (starch), e.g., potato; elaioplasts store oils and fats whereas the aleuroplasts store proteins.

125. Answer (4)

Hint: Centriole shows cartwheel appearance.

Sol.: Centriole is surrounded by massule.

126. Answer (3)

Hint: Electron microscopic studies of eukaryotic cells reveal the presence of a network or reticulum of tiny tubular structures scattered in the cytoplasm that is called the endoplasmic reticulum.

Sol.: ER divides the intracellular space into two distinct compartments, *i.e.*, luminal (inside ER) and extra luminal (cytoplasm) compartments.

127. Answer (2)

Hint: *Agaricus* belongs to this class of fungi.

Sol.: Basidiomycetes produce sexual spores exogenously. These sexual spores are known as basidiospores.

128. Answer (1)

Hint: This is the phase of actual cell division.

Sol.: M phase is the most dramatic period of the cell cycle, involving a major reorganisation of virtually all components of the cell.

129. Answer (4)

Hint: In animal cells, centriole duplication takes place in S phase.

Sol.: In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm.

130. Answer (1)

Hint: Syncytium forms when karyokinesis is not followed by cytokinesis.

Sol.: In plant cells, cytokinesis is achieved by the formation of a cell plate. Phragmoplast is formed by Golgi complex and grows centrifugally to form cell plate

131. Answer (4)

Hint: Site of protein synthesis

Sol.: Nissl's bodies are found in dendrites and cyton (cell bodies) only.

Synaptic vesicles contain neurotransmitters.

132. Answer (1)

Hint: Phylum Aschelminthes

Sol.: Pseudocoelom and unisexual nature is seen in the members of the phylum Aschelminthes.

Segmentation for the first time was seen in the members of the phylum Annelida.

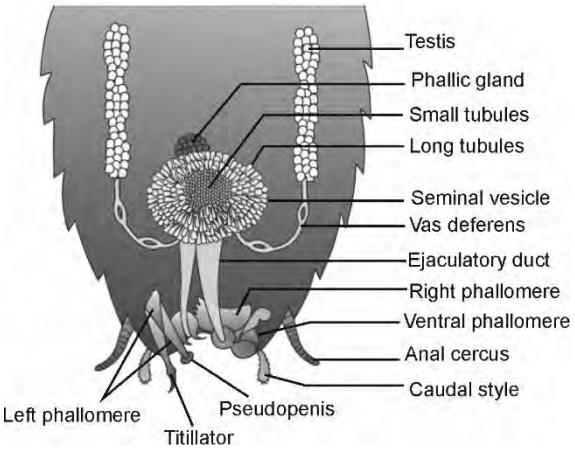
Calcareous endoskeleton is seen in the members of the phylum Echinodermata.

133. Answer (4)

Hint: It secretes the outermost layer of spermatophore.

Sol.: Ovaries, collaterial glands, spermathecae and vas deferens are paired structures.

Phallic gland is a single gland which is a part of male reproductive system in cockroach.



134. Answer (3)

Hint: Sac-like structure

Sol.: A triangular structure called sinus venosus joins the right atrium. It receives blood through the major veins called vena cava.

The ventricle opens into a sac-like conus arteriosus on the ventral side of the heart.

135. Answer (1)

Hint: Primary function is hormone production

Sol.: Pituitary, pineal, thyroid, adrenal, pancreas, parathyroid, thymus and gonads (testis in males and ovaries in females) are the organised endocrine bodies in our body.

136. Answer (1)

Hint: Action potential

Sol.: The electrical potential difference across a depolarised membrane is called action potential or nerve impulse.

137. Answer (4)

Hint: Monomeric proteins of thick filament

Sol.: Many monomeric proteins called meromyosins constitute one thick filament.

Each actin filament is made of two filamentous actins helically wound to each other.

Two filaments of another protein, tropomyosin, also runs close to the 'F' actins throughout its length. A complex protein troponin is distributed at regular intervals on the tropomyosin.

138. Answer (4)

Hint: Also known as farmer's friend

Sol.: Nephridia – *Nereis*, earthworm

Green glands – Prawns

Kidneys – *Bangarus*

Malpighian tubules – Cockroach

139. Answer (1)

Hint: Occupational respiratory disease

Sol.: In industries that involve grinding or stone-breaking, so much dust is produced that the defense mechanism of the body cannot fully cope with the situation. Long exposure can give rise to inflammation leading to fibrosis (proliferation of fibrous tissues) and thus causing serious lung damage.

140. Answer (4)

Hint: Homopolymer of glucose

Sol.:

Pigments	Carotenoids, Anthocyanins, *etc.*
Alkaloids	Morphine, Codeine, *etc.*
Terpenoids	Monoterpenes, Diterpenes *etc.*
Essential oils	Lemon grass oil, *etc.*
Toxins	Abrin, Ricin
Lectins	Concanavalin A
Drugs	Vinblastin, curcumin, *etc.*
Polymeric substances	Rubber, gums, cellulose

141. Answer (1)

Hint: Intervertebral disc

Sol.: The intercellular material of cartilage is solid and pliable, and resists compression. Cells of this tissue are enclosed in small cavities within the matrix secreted by them. Cartilage is present between adjacent vertebrae of the vertebral column.

142. Answer (1)

Hint: Fibrins are network of threads.

Sol.: Fibrins are formed by conversion of inactivated fibrinogens in the plasma by the enzyme thrombin. Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase is required for the above conversion.

143. Answer (3)

Hint: This structure is represented by tympanum.

Sol.: On land, buccal cavity, skin and lungs act as respiratory organs

- In female frogs, ureters and oviducts open separately in the cloaca.
- RBCs are nucleated and contain red-coloured pigment called haemoglobin.

144. Answer (3)

Hint: Weak bonds are broken

Sol.: Activity of an enzyme declines both below and above the optimum value. Low temperature preserves the enzyme in temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

145. Answer (2)

Hint: Posterior pituitary is under direct neural regulation of hypothalamus.

Sol.: Neurohypophysis (Pars nervosa), also known as posterior pituitary, stores and releases two hormones called oxytocin and vasopressin, which are actually synthesised by the hypothalamus and are transported axonally to neurohypophysis.

ACTH stimulates the synthesis and secretion of steroid hormones called glucocorticoids from the adrenal cortex.

146. Answer (4)

Hint: One which leads to ventricular systole

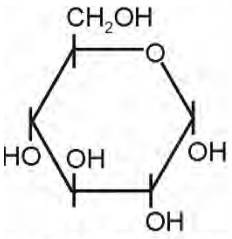
Sol.:

P-wave	–	Electrical excitation of atria (atrial depolarisation)
QRS complex	–	Ventricular depolarisation
T-wave	–	Ventricular repolarisation and end of T-wave marks the end of ventricular systole

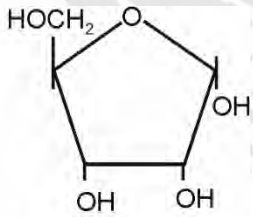
147. Answer (4)

Hint: Glucose and fructose are hexose sugars.

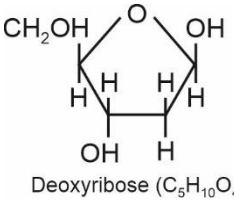
Sol.:



$C_6H_{12}O_6$ (Glucose)



$C_5H_{10}O_5$ (Ribose)



Deoxyribose ($C_5H_{10}O_4$)

148. Answer (2)

Hint: Maximum amount of CO_2 is carried as bicarbonate.

Sol.: Nearly 20-25% of CO_2 is transported by RBCs whereas 70% of it is carried as bicarbonate. About 7% of CO_2 is carried in a dissolved state through plasma.

Carbon monoxide combines with haemoglobin to form carboxyhaemoglobin.

149. Answer (3)

Hint: Limbic system is a part of forebrain.

Sol.: Limbic system is a complex structure formed by inner parts of cerebral hemispheres and a group of associated deep structures like amygdala, hippocampus, *etc*.

Along with hypothalamus, it is involved in regulation of sexual behaviour, expression of emotional reactions (*e.g.* excitement, pleasure, rage, fear), motivation and olfaction.

Respiration, cardiovascular reflexes and gastric secretions are controlled by medulla of hindbrain.

150. Answer (2)

Hint: HMM projects outwards on thick filament at regular intervals.

Sol.: Each meromyosin has two important parts, a globular head with short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter, the light meromyosin (LMM). The HMM component *i.e.*, head and short arm projects outwards at regular intervals.

151. Answer (2)

Hint: Cephalochordate

Sol.: *Ascidia*, *Salpa* and *Doliolum* are urochordates, while *Branchiostoma* is a cephalochorodate.

152. Answer (4)

Hint: ADH is also called vasopressin.

Sol.: Osmoreceptors in the body are activated by changes in blood volume, body fluid volume and ionic concentration.

An excessive loss of fluid from the body can activate these receptors which stimulate the hypothalamus to release ADH or vasopressin from neurohypophysis.

153. Answer (4)

Hint: Secretin and CCK, both act on pancreas.

Sol.:

- Gastrin acts on gastric glands and stimulates the secretion of HCl and pepsinogen.
- Secretin acts on the exocrine pancreas and stimulates the secretion of water and bicarbonate ions.
- CCK acts on both pancreas and gall bladder and stimulates the secretion of pancreatic enzymes and bile juice respectively.
- GIP inhibits gastric secretion and motility.

154. Answer (3)
Hint: Exclude the part of midbrain
Sol.: The brain of a frog is divided into forebrain, midbrain and hindbrain. Forebrain includes olfactory lobes, paired cerebral hemispheres and unpaired diencephalon.
The midbrain is characterised by a pair of optic lobes.
Hindbrain consists of cerebellum and medulla oblongata.

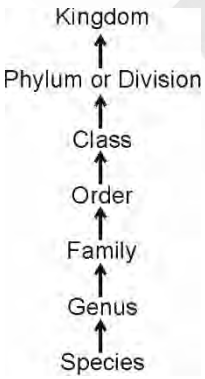
155. Answer (3)
Hint: It consists of microvilli
Sol.:

Walls of blood vessels	–	Squamous epithelium
Bronchioles	–	Ciliated epithelium
Lining of small intestine	–	Brush-bordered columnar epithelium
Dry surface of skin	–	Compound epithelium

156. Answer (1)
Hint: In binomial nomenclature, the first word denoting the genus starts with a capital letter while the specific epithet starts with a small letter.
Sol.: The scientific name of wheat is *Triticum aestivum.*

157. Answer (4)
Hint: Systematics takes into account evolutionary relationships between organisms.
Sol.: Phylogeny is the evolutionary relationships amongst organisms. Systematics is taxonomy along with phylogeny.

158. Answer (3)
Hint: Ascending order of taxonomical categories is as follows:



Sol.: The correct ascending sequential order of taxonomical categories for a housefly is
Musca (genus) → Muscidae (family) → Diptera (order) → Insecta (class) → Arthropoda (phylum)

159. Answer (4)
Hint: This causative agent is an abnormally folded protein.
Sol.: The most notable diseases caused by prions are bovine spongiform encephalopathy (BSE) commonly called mad cow disease in cattle and its analogous variant Cr–Jacob disease (CJD) in humans.

160. Answer (3)
Hint: Cell wall prevents the cell from bursting or collapsing.
Sol.: Slime layer protects the cell from loss of water and nutrients. Capsule allows bacterium to hide from host's immune system. Cell membrane in prokaryotes is similar structurally to that of eukaryotes.

161. Answer (4)
Hint: False feet are pseudopodia and are found in *Amoeba*.
Sol.: Ciliated protozoans have a cavity (gullet) that opens to the outside of the cell surface.

162. Answer (4)
Hint: Complex IV of ETS of mitochondria is Cytochrome *c* oxidase.
Sol.: Cytochrome *c* is a small protein attached to the outer surface of the inner membrane of mitochondria and acts as a mobile carrier for transfer of electrons between complex III and IV. Complex IV refers to cytochrome *c* oxidase complex containing cytochromes *a* and a_3, and two copper centres.

163. Answer (4)
Hint: This organism is *Nostoc.*
Sol.: *Nostoc* is a cyanobacterium that can fix both atmospheric nitrogen and carbon dioxide.

164. Answer (3)
Hint: Neem has pinnately compound leaves.
Sol.: In a pinnately compound leaf, a number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf as in neem.

165. Answer (2)
Hint: *Pteris* and *Selaginella* are pteridophytes.
Sol.: *Cedrus* is a gymnosperm with branched stem.

166. Answer (2)
Hint: Anaphase is the third stage of mitotic karyokinesis.
Sol.: In anaphase, as each daughter chromosome moves away from the equatorial plate, the centromere of the resultant chromosome remains directed towards the pole and the arms of the chromosome trailing behind.

167. Answer (2)
Hint: It is a gaseous phytohormone.
Sol.: Ethylene is used to initiate flowering and for synchronising fruit-set in pineapples. It also induces flowering in mango.

168. Answer (2)

Hint: Mosses are of great ecological importance.

Sol.: Mosses along with lichens are the first organisms to colonise rocks and hence, are of great ecological importance. Since mosses form dense mats on the soil, they reduce the impact of falling rain and prevent soil erosion.

169. Answer (3)

Hint: Mango develops from monocarpellary superior ovary.

Sol.: Mango fruit is a drupe.

170. Answer (1)

Hint: The cells of this region shows excessive vacuolation.

Sol.: The cells proximal to the meristematic region undergo rapid elongation and enlargement and are responsible for the growth of the root in length. This region is called the region of elongation.

171. Answer (1)

Hint: FRC is functional residual capacity

Sol.: FRC is the volume of air that will remain in the lungs after a normal expiration. Since, RV remains in lungs even after a forcible expiration, thus FRC cannot be measured with a simple spirometer.

172. Answer (3)

Hint: Function of medulla oblongata

Sol.: Hypothalamus contains centres which control body temperature, urge for eating and drinking.

Medulla oblongata controls gastric secretions.

173. Answer (2)

Hint: Member of the phylum Mollusca

Sol.:

Balanoglossus	–	Stomochord in collar region
Sepia (Cuttlefish)	–	Feather-like gills in mantle cavity
Laccifer	–	Lac insect is an economically important insect
Hirudinaria	–	Blood sucking leech
Nereis	–	Parapodia, lateral appendages help in swimming

174. Answer (2)

Hint: Also called flame cells

Sol.: Protonephridia is the excretory structure in Platyhelminthes, rotifers, some annelids and cephalochordate–*Amphioxus*.

175. Answer (3)

Hint: Together with 8^{th} and 9^{th} sterna, it forms brood pouch.

Sol.: The abdomen in both male and female cockroaches consists of 10 segments. In females, the 7^{th} sternum is boat shaped.

176. Answer (3)

Hint: Basophils constitute least percentage of total WBCs

Sol.: Angina pectoris – Acute chest pain

Basophils – 0.5-1% of the total WBCs

Eosinophils – 2-3% of the total WBCs

Cardiac arrest – Heart stops beating

177. Answer (4)

Hint: Breakdown of glycogen

Sol.: Catecholamines stimulate the breakdown of glycogen resulting in an increased concentration of glucose in blood. Glucocorticoids stimulate gluconeogenesis, lipolysis and proteolysis, suppress immune response and produce anti-inflammatory reactions.

178. Answer (2)

Hint: This name is also given to a bacterial disease.

Sol.: Fatigue means a feeling of overtiredness. Spasms are sustained painful muscular contractions.

Muscle tonus refers to partial muscle contraction in relaxed state.

179. Answer (2)

Hint: Opens into renal pelvis

Sol.: Each nephron has two parts – the glomerulus and the renal tubule.

Glomerulus is a tuft of capillaries formed by afferent arteriole – a fine branch of renal artery. The renal tubule begins with a double walled cup-like structure called Bowman's capsule. The tubule further continues to form a highly coiled PCT. A hairpin shaped Henle's loop, is the next part of the tubule which has an ascending and a descending limb. The ascending limb continues as another highly coiled tubular region called DCT.

Collecting duct is not a part of nephron.

180. Answer (2)

Hint: Heart failure leads to inadequate blood supply.

Sol.: Heart failure is the state of the heart when it is not pumping blood effectively enough to meet the needs of the body. Congestion of the lungs is one of the main symptoms of congestive heart failure.

Heart attack is when the heart muscle is suddenly damaged by an inadequate blood supply.

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