Shivam Classes
A Premier Institute JEE(Main & Adv.)
NEET/AIIMS.NTSE.OLYMPID KVPY
SHIVAM CLASSES - By IITians
TEST SERIES
XII + TARGET

[NEET - 5 **Full Syllabus** **Date :** 11-11-2024

DURATION : 3 HR **DATE :** 11-11-2024 **M. MARKS : 720**

ANSWER KEY

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
1. (4)	51. (2)	101. (3)	151. (2)
2. (2)	52. (4)	102. (4)	152. (3)
3. (1)	53. (2)	103. (4)	153. (2)
4. (1)	54. (4)	104. (1)	154. (1)
5. (2)	55. (1)	105. (1)	155. (2)
6. (1)	56. (1)	106. (1)	156. (2)
7. (4)	57. (1)	107. (2)	157. (2)
8. (3)	58. (3)	108. (2)	158. (4)
9. (1)	59. (3)	109. (1)	159. (1)
10. (2)	60. (3)	110. (4)	160. (2)
11. (1)	61. (1)	111. (2)	161. (1)
12. (4)	62. (1)	112. (3)	162. (1)
13. (4)	63. (4)	113. (1)	163. (2)
14. (4)	64. (3)	114. (3)	164. (2)
15. (4)	65. (3)	115. (4)	165. (2)
16. (3)	66. (1)	116. (3)	166. (3)
17. (2)	67. (2)	117. (2)	167. (4)
18. (3)	68. (4)	118. (4)	168. (3)
19. (1)	69. (2)	119. (2)	169. (1)
20. (3)	70. (3)	120. (4)	170. (2)
21. (1)	71. (3)	121. (2)	171. (3)
22. (1)	72. (3)	122. (1)	172. (1)
23. (1)	73. (2)	123. (2)	173. (2)
24. (3)	74. (1)	124. (1)	174. (2)
25. (2)	75. (4)	125. (1)	175. (2)
26. (1)	76. (4)	126. (2)	176. (2)
27. (4)	77. (1)	127. (1)	177. (3)
28. (3)	78. (2)	128. (1)	178. (4)
29. (3)	79. (4)	129. (2)	179. (2)
30. (2)	80. (3)	130. (3)	180. (2)
31. (2)	81. (3)	131. (1)	181. (3)
32. (3)	82. (1)	132. (3)	182. (2)
33. (1)	83. (2)	133. (4)	183. (3)
34. (1)	84. (3)	134. (4)	184. (2)
35. (4)	85. (4)	135. (4)	185. (2)
36. (3)	86. (2)	136. (3)	186. (1)
37. (1)	87. (4)	137. (3)	187. (3)
38. (2)	88. (1)	138. (3)	188. (2)
39. (2)	89. (3)	139. (1)	189. (1)
40. (1)	90. (2)	140. (1)	190. (3)
41. (1)	91. (3)	141. (3)	191. (2)
42. (4)	92. (3)	142. (1)	192. (2)
43. (2)	93. (4)	143. (3)	193. (4)
44. (4)	94. (1)	144. (3)	194. (4)
45. (1)	95. (3)	145. (2)	195. (1)
46. (4)	96. (4)	146. (4)	196. (4)
47. (1)	97. (4)	147. (4)	197. (1)
48. (3)	98. (4)	148. (1)	198. (4)
49. (1)	99. (2)	149. (3)	199. (1)
50. (4)	100. (2).	150. (3)	200. (1)

SECTION – I (PHYSICS)

1. **(4)**

$m = P$

$m = -\frac{v}{u} \Rightarrow P = -\frac{v}{u}$

$v = -Pu$

$-\frac{1}{f} = \frac{1}{-v} + \frac{1}{-u} \Rightarrow \frac{1}{-f} = \frac{1}{-Pu} - \frac{1}{u}$

$\frac{1}{f} = \frac{1}{Pu} + \frac{1}{u} \Rightarrow \frac{1}{f} = \frac{1}{u}\left(\frac{1}{P} + 1\right)$

$u = \frac{f(P+1)}{P}$

2. **(2)**

$\frac{4}{3}\pi R^3 = 64\frac{4}{3}\pi r^3 \Rightarrow R = 4r$

Potential for the big drop.

$V = k\frac{Q}{R} = k\frac{64q}{4r} = 16\frac{kq}{r}$

Potential for one small drop

$v = k\frac{q}{r}$

$\frac{V}{v} = 16$

3. **(1)**

$v \propto t \rightarrow$ straight line

$\frac{dv}{dt} \propto t^0 \rightarrow$ straight line parallel to time axis.

4. **(1)**

Here, R_1 = 0.2 m = 20 cm,

R_2 = –20 cm, μ = 1.5; f = ? d = 0.2 m = 20 cm,

F = ?

As, $\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

$\therefore \frac{1}{f} = (1.5-1)\left(\frac{1}{20} + \frac{1}{20}\right) = 0.5 \times \frac{1}{10} = \frac{1}{20}$

$\therefore f$ = 20 cm

Now = $f_1 = f_2$ = 20 cm

As, $\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 f_2}$

$\therefore \frac{1}{F} = \frac{1}{20} + \frac{1}{20} - \frac{20}{20 \times 20} = \frac{1}{20}$, $F = 20$cm

5. **(2)**

$T = m\omega^2 R$

$\omega = \sqrt{\frac{T}{mR}}$

$\omega = \sqrt{\frac{4}{4 \times 169}} = \frac{1}{13}$ rad/s

$v = \omega R = \frac{169}{13} = 13$m/s

6. **(1)**

7. **(4)**

$n_e = 5 \times 10^{22} - 5 \times 10^{20} = (5 - 0.05) \times 10^{22}$

$= 4.95 \times 10^{22}\text{m}^{-3}$

$= n_h = \frac{n_i^2}{n_e} = \frac{(1.5 \times 10^{16})^2}{4.95 \times 10^{22}}$

$= 4.54 \times 10^{9}\text{m}^{-3}$

As $n_e > n_h$, so the material is n-type semiconductor

8. **(3)**

If we put 0,0 then we get output 1.

9. **(1)**

$\frac{\text{Forward resistance}}{\text{Reverse resistance}} = \frac{10}{10^5} = \frac{10^{-4}}{1}$

$\Rightarrow$ hence 10^{-4} : 1

10. **(2)**

$\alpha_{dc} = \frac{I_c}{I_e} = \frac{(I_e - I_b)}{I_e}$

$\therefore I_b = I_e - \alpha_{dc} I_e = (1 - \alpha_{dc}) I_e$

= 1.5 mA

11. **(1)**

$\frac{GmM}{R^n} = \frac{mv^2}{R} \Rightarrow \sqrt{\frac{GM}{R^{n-1}}}$

$T = \frac{2\pi R}{v} = \frac{2\pi R}{\sqrt{GM}} R^{\left(\frac{n-1}{2}\right)}$

$T \propto R^{\left(\frac{n+1}{2}\right)}$

12. **(4)**

13. **(4)**

$\lambda dt = \lambda_1 dt + \lambda_2 dt$

$\lambda = \lambda_1 + \lambda_2$

$\frac{\log_e 2}{t} = \frac{\log_e 2}{t_1} + \frac{\log_e 2}{t_2}$

$$\frac{1}{t}=\frac{1}{t_1}+\frac{1}{t_2}\Rightarrow t=\frac{t_1t_2}{t_1+t_2}$$

14. (4)

$U=nC_vT$

For He , $C_v=\frac{3}{2}R$

$U=2\times\frac{3}{2}R\times 300=900R$

For N_2, $C_v=\frac{5}{2}R$

$U=\frac{56}{28}\times\frac{5}{2}R\times 300=1500R$

For O_2, $C_v=\frac{5}{2}R$

$U=\frac{8}{32}\times\frac{5}{2}R\times 300=187.5R$

For Ar, $C_v=\frac{3}{2}R$

$U=\frac{6\times10^{26}}{6.023\times10^{23}}\times\frac{3}{2}R\times 900=896712R$

15. (4)

$C=(M_0)S$

For H_2 as well as N_2

$C_P-C_V=R$

$(M_0)S_P-(M_0)S_V=R$

$S_P-S_V=\frac{R}{2}=a$

For N_2 gas

$S_P-S_V=\frac{R}{28}=b$

So $\frac{a}{b}=\frac{\frac{R}{2}}{\frac{R}{28}}=14\Rightarrow a=14b$

16. (3)

$\eta_A=1-\frac{T_2}{T_1}=1-\frac{500}{1000}=\frac{1}{2}$

$\eta_B=1-\frac{T_2}{T_1}=1-\frac{400}{1100}=\frac{7}{11}$ Clearly, $\eta_A<\eta_B$

17. (2)

$M=\int_a^{2a}\frac{\mu_0}{2\pi x}adx=\frac{\mu_0 a}{2\pi}\ln(2)$

18. (3)

$\text{Volume}=\frac{\text{mass}}{\text{density}}$

Volume of first substance, $V_1=\frac{1}{2}$

Volume of second substance, $V_2=\frac{4}{3}$

$\therefore$ Relative density $=\frac{1+4}{\left(\frac{1}{2}\right)+\left(\frac{4}{3}\right)}=\frac{30}{11}=2.73$

19. (1)

Poisson's ration, $\sigma=\frac{-(\Delta r/r)}{(\Delta L/L)}$

Or $\frac{\Delta r}{r}=-1\times10^{-3}$

Volume V = πr^2L

$\frac{\Delta V}{V}=\frac{\Delta(\pi r^2L)}{\pi r^2L}=\frac{\Delta L}{L}+\frac{2\Delta r}{r}$

$\therefore\ \frac{\Delta V}{v}=0$

% increase in volume

$=\frac{\Delta V}{V}\times100=0\times100=0\%$

20. (3)

$\eta_1=\eta_2$

$1-\frac{T_2}{T_1}=1-\frac{T_3}{T_2}$

$T_2=\sqrt{T_1T_3}$

$\sqrt{400\times100}=200K$

21. (1)

$A=\sqrt{4^2+3^2+2(4)(3)\cos\left(\frac{\pi}{3}\right)}$

$=\sqrt{4^2+3^2+12}\Rightarrow\sqrt{16+9+12}=\sqrt{37}$

22. (1)

For orthogonal, $\vec{A}.\vec{B}=0$

23. (1)

Loss in P.E. = Gain in K.E.

$mg\frac{l}{3}+mg\left(\frac{2l}{3}\right)+mgl=\frac{1}{2}\left(m\left(\frac{l}{3}\right)^2+m\left(\frac{2l}{3}\right)^2+ml^2\right)\omega^2$

$\Rightarrow\omega=\sqrt{\frac{36g}{14l}}\Rightarrow v_B=wl_B=\frac{2l}{3}\sqrt{\frac{36g}{14l}}=\sqrt{\frac{8gl}{7}}$

24. (3)

$N-mg\cos\theta=\frac{mv^2}{R}$

$\cos\theta=\frac{h}{R}\Rightarrow h=R\cos\theta$

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

$$K = mgh \Rightarrow h = \frac{k}{mg}$$

$$N = \frac{mv^2}{r} + mg\cos\theta$$

$$N = 2\frac{mv^2}{2R} + \frac{mgh}{R}$$

$$N = \frac{2K}{R} + \frac{K}{R} \Rightarrow N = \frac{3K}{R}$$

25. (2)

Using vector product

$\vec{C} = \vec{a} \times \vec{b}$ than, $\vec{C}.\vec{a} = 0$

$\vec{C}.\vec{b} = 0$

26. (1)

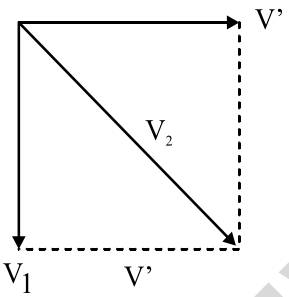
P.E = Total *K.E*

$$mgh = \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$$

$$mgh = \frac{7}{10}mV^2$$

$$v = \sqrt{\frac{10}{7}gh}$$

27. (4)



$$v_1^2 + v'^2 = v_2^2$$

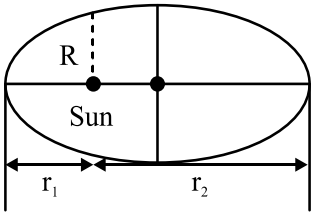
$$v' = \sqrt{v_2^2 - v_1^2}\ \text{s}$$

28. (3)

$$\Delta U = \frac{mgR}{1+\frac{R}{h}} = \frac{mgR}{1+\frac{R}{3R}} = \frac{3}{4}mgR$$

29. (3)

From fig.



$$\frac{2}{R} = \frac{1}{r_1} + \frac{1}{r_2}$$

$$\Rightarrow R = \frac{2r_1r_2}{r_1 + r_2}$$

30. (2)

$mv = 2mv'$

$$v' = \frac{v}{2}$$

$$\frac{1}{2}(2m)v'^2 + \frac{1}{2}kx^2 = 2mgx$$

$$\frac{1}{2}(2m)\frac{v^2}{4} + \frac{1}{2}k\frac{m^2g^2}{k^2} = 2mg\left(\frac{mg}{k}\right)$$

$$\frac{v^2}{4} = \frac{3}{2}\frac{mg^2}{k}$$

$$v = \sqrt{\frac{6mg^2}{k}}$$

31. (2)

P = Power = $[ML^2T^{-3}]$

x = Position = $[L]$

t = time = $[T]$

Now, $a - x^2$

i.e. dimension $[a]$ = dimension $[x^2]$

Dimension $[a] = [L^2]$

$$\Rightarrow \quad [ML^2T^{-3}] = \frac{[L^2]}{b[T]}$$

$$\Rightarrow \quad b = \frac{[L^2]}{[T]\times[ML^2T^{-3}]}$$

$$\Rightarrow \quad b = [M^{-1}L^0T^2]$$

$$\Rightarrow \quad \boxed{b = M^{-1}L^0T^2}$$

32. (3)

33. (1)

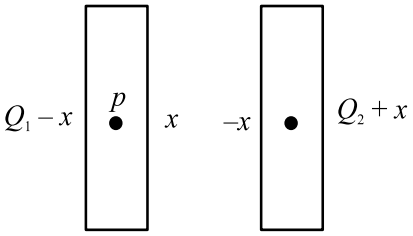
Gravitational field g =– $\frac{\Delta V}{\Delta x} = -\left(\frac{-4}{10}\right) = \frac{4}{10}$ J/kgm

Work done in moving a mass of 2 kg from the surface to a point 5m above the surface.

$$W = mgh = (2kg)\left(\frac{4}{10}\frac{j}{kgm}\right)(5m) = 4J$$

34. (1)

$$Q_A = Q_D = \frac{Q_1 + Q_2}{2} \text{ and } Q_B = -Q_C = \frac{Q_1 - Q_2}{2}$$



Electric field inside the region of two plate is 0

$$\frac{(Q_1 - x)}{2A\varepsilon_0} - \frac{x}{2A\varepsilon_0} + \frac{x}{2A\varepsilon_0} - \frac{Q_2 + x}{2A\varepsilon_0} = 0$$

$Q_1 - x = Q_2 + x$

$$x = \frac{Q_1 + Q_2}{2}$$

$$\therefore \quad Q_B = -Q_c = \frac{Q_1 - Q_2}{2}$$

$$Q_A = -Q_D = \frac{Q_1 + Q_2}{2}$$

35. (4)

As electric field is conservative field so work done along close path is zero

36. (3)

$$F = \frac{1}{4\pi\varepsilon_0}\frac{(q)(q)}{d^2} \Rightarrow F = \frac{q^2}{4\pi\varepsilon_0 d^2}$$

$$q^2 = 4\pi\varepsilon_0 F d^2$$

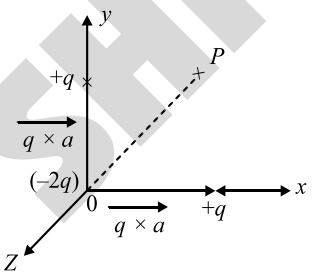
$$q = \sqrt{4\pi\varepsilon_0 F d^2} \qquad \ldots \text{(i)}$$

$$\therefore \quad n = \frac{q}{e}$$

$$n = \frac{\sqrt{4\pi\varepsilon_0 F d^2}}{e} \qquad \text{[Using … (i)]}$$

$$n = \sqrt{\frac{4\pi\varepsilon_0 F d^2}{e^2}}$$

37. (1)



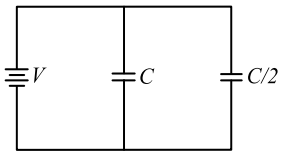
$$\therefore \quad p_{net} = \sqrt{q^2a^2 + q^2a^2} = \sqrt{2}qa$$

38. (2)

$Q_1 = CV$;

$Q_2 = C/2\ V$

Also, $Q = Q_1 + Q_2$



$$= CV + \frac{C}{2}V = \frac{3}{2}CV.$$

Work done in charging fully both the condenser is given by

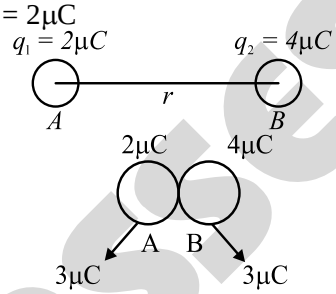
$$W = \frac{1}{2}QV = \frac{1}{2} \times \left(\frac{3}{2}CV\right)V = \frac{3}{4}CV^2$$

39. (2)

Without loss in generality consider

Let $q_1 = 2\mu C$

$q_2 = 2\mu C$



$$F_2 = \frac{K3\mu C \times 3\mu C}{(1)^2} \qquad \ldots \text{(ii)}$$

$F_2 \propto 9$

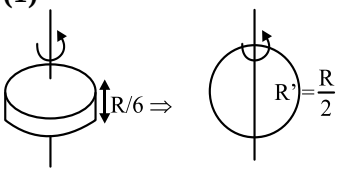
$F_1 \propto 8$

$F_2 > F_1$.

40. (1)

$\therefore$ Potential energy = $-pE\cos\theta$

41. (1)



$$I = \frac{1}{2}MR^2 \Rightarrow MR^2 = 2I$$

$V_p = V_{sp}$

$$\left[\pi R^2 \times \frac{R}{6}\right] = \frac{4}{3}\pi R'^3$$

$$R'^3 = \frac{R^3}{8} \Rightarrow R' = \frac{R}{2}$$

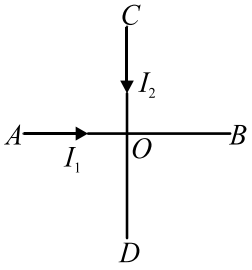
$$I_{sp.} = \frac{2}{5}M\left(\frac{R}{2}\right)^2$$

$$I_{sp.} = \frac{2}{5}\frac{MR^2}{4}$$

$$I_{sp.} = \frac{2}{5}\frac{(2I)}{4}$$

$$= \frac{I}{5}$$

42. (4)



$$B = \left(B_1^2 + B_2^2\right)^{1/2} = \left[\left(\frac{\mu_0}{4\pi}\frac{2I_1}{d}\right)^2 + \left(\frac{\mu_0}{4\pi}\frac{2I_2}{d}\right)^2\right]^{1/2}$$

43. (2)

Kinetic energy of a charged particle.

$$K = \frac{1}{2}mv^2 \text{ or } v = \sqrt{\frac{2K}{m}}$$

$$R = \frac{mv}{Bq} = \frac{m}{Bq}\sqrt{\frac{2K}{m}} = \frac{\sqrt{2mK}}{Bq}$$

Mass of a proton, $m_p = m$

Mass of an α-particle, $m_\alpha = 4m$

Charge of a proton, $q_p = e$

Charge of an α-particle, $q_\alpha = 2e$

$$\therefore\ R_P = \frac{\sqrt{2m_pK_p}}{Bq_p} = \frac{\sqrt{2mK_p}}{Be}$$

$$R_\alpha = \frac{\sqrt{2m_\alpha K_\alpha}}{Bq_\alpha} = \frac{\sqrt{2\times 4m\times K_\alpha}}{2Be}$$

$$\therefore\ \frac{R_p}{R_\alpha} = \sqrt{\frac{K_p}{K_\alpha}}$$

As, $R_p = R_\alpha$ (given)

$\therefore\ K_\alpha = K_p = 1$MeV.

44. (4)

$$\frac{T}{A\left(\frac{l_1 - l}{l}\right)} = Y$$

$$\frac{l}{AY} = \frac{l_1 - l}{T_1} \quad \text{(i)}$$

Similarly,

$$\frac{l}{AY} = \frac{l_2 - l}{T_2} \quad \text{(ii)}$$

From equations (i) and (ii)

$$\Rightarrow (l_1 - l)T_2 = T_1(l_2 - l)$$

$$\frac{T_2l_1 - l_2T_1}{T_2 - T_1} = l$$

45. (1)

$$h = \frac{1}{2}gt^2 = \frac{1}{2}\times 10\times 16 = 80\text{m}$$

$$v_{avg} = \frac{80}{4} = 20m/s$$

46. (4)

Stress = E × Strain

Slope = E or Y

$(\text{Slope})_A > (\text{Slope})_B$

$$\frac{Y_A}{Y_B} = \frac{\tan\theta_A}{\tan\theta_B}$$

$$\Rightarrow \frac{\tan 60^\circ}{\tan 30^\circ} = \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = 3$$

$Y_A = 3Y_B$

47. (1)

Fact based

48. (3)

Fact based

49. (1)

Fact based

50. (4)

Fact based

SECTION – II (CHEMISTRY)

51. (2)

d block elements are there and very slight change almost negligible change is observed in Mn, Fe and Co.

52. (4)

$$P_{O_2} = X_{O_2} \times P_T$$

$$P_{O_2} = P \times \frac{1}{3} = \frac{P}{3}$$

53. (2)

Bases are bonded through Hydrogen bonds

54. (4)

Under adiabatic conditions dq = 0

dU = dq + dW

So $\Delta U = W$.

55. (1)

Catalyse biochemical reactions

56. (1)

N_2

57. (1)

Aldehyde group give silver mirror test.

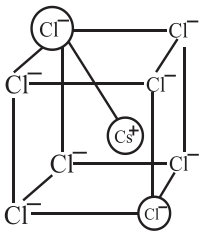
58. (3)

The bond order of N_2, O_2, and O_2^- are 3, 2 and 1.5 respectively.

Since higher bond order implies higher bond dissociation energy, hence the correct order will be

$$N_2 > O_2 > O_2^-$$

59. (3)



Relation between radius of cation, anion and edge length of the cube

$$2r_{Cs^+} + 2r_{Cl^-} = \sqrt{3}a$$

$$r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}a}{2}$$

60. (3)

Alkene on ozonolysis gives aldehyde or ketone group.

61. (1)

Zr and Hf due to lanthanoid contraction.

62. (1)

The metal that gives hydrogen gas upon treatment with both acids as well as bases is Zinc.

63. (4)

$P_T = \chi_A (P_A - P_B) + P_B$

64. (3)

The rate of a chemical reaction tells us about the speed of reaction, that is how slow or fast the reaction is taking place.

65. (3)

All amino acids except glycine are optically active. And lysine and glutamic acids are optically active

66. (1)

Aniline

67. (2)

$P_A^o = ?, \text{Given } P_B^o = 200\,\text{mm}, X_A = 0.6$

$X_B = 1 - 0.6 = 0.4, P = 290$

$P = P_A + P_B = P_A^o X_A + P_B^o X_B$

$290 = P_A^o \times 0.6 + 200 \times 0.4$

$\therefore P_A^o = 350\,\text{mm}$

68. (4)

$$n_A : n_B : n_C = \left(\frac{M_A}{W_A}\right)\left(\frac{it}{nF}\right) : \left(\frac{M_B}{W_B}\right)\left(\frac{it}{nF}\right) : \left(\frac{M_C}{W_C}\right)\left(\frac{it}{nF}\right)$$

$$n_A : n_B : n_c = \left(\frac{4.5}{15}\right) : \left(\frac{2.7}{27}\right) : \left(\frac{9.6}{48}\right)$$

$n_A : n_B : n_C = 3 : 1 : 2$

69. (2)

Methane will be produced as gas.

70. (3)

After 100 times dilution, Concentration of H^+ ions will be 10^{-8} M. So, Its pH will be 6.98, because we have to consider the concentration of H^+ from water also.

71. **(3)**

Chemical formula of Plaster of Paris is

$CaSO_4.\frac{1}{2}H_2O$

72. **(3)**

1 BCC unit cell has 2 atoms;
Therefore, 8 BCC unit cells will have
$8 \times 2 = 16$ atoms

73. **(2)**

Oxidation number of Br in HOBr = +1
Oxidation number of Br in HBr = –1
So, it is Both oxidised and reduced.

74. **(1)**

1 - Ethoxy - 2 - nitrocyclohexane

75. **(4)**

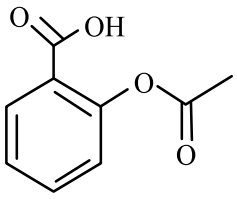
A	B	C
+0.5V	–3.0V	–1.2V

The higher the negative value of reduction potential, the more is the reducing power.

Hence, B > C > A

76. **(4)**

The carboxyl functional group (–COOH) is present in aspirin.



77. **(1)**

Both the assertion and the reason are correct, and the reason is the correct explanation of the assertion .

78. **(2)**

$K_3[Fe(CN)_6] \rightarrow 3K^+ + [Fe(CN)_6]^{-4}$; i = 4;

Now for, $Al(NO_3)_3$ also has i = 4

79. **(4)**

In strongly acidic solutions, aniline becomes anilinum ion due to which it become more electrophilic in nature. So, the assertion is incorrect. Reason is correct.

80. **(3)**

$Sc^{+2} > Ti^{+3} > V^{+3} > Cr^{+3}$ is incorrect because Sc^{+2} will not have high polarising power due to its charge So given order is incorrect.

81. **(3)**

Since, E° is positive. So, $\Delta G° = -nFE° =$ negative.
Also, $\Delta G° = -RT\ln K$, $\Delta G°$ is negative. So, K will be greater than 1.

82. **(1)**

2,4-DNP test is given by aldehyde and ketone. The Iodoform test is only given by those groups, which contain the $-COCH_3$ type group. So, the only option (1) is that compound, which follow all three conditions.

83. **(2)**

A process carried out infinitesimally slowly - Reversible process. A process in which no heat enters or leaves the system - Adiabatic process. A process carried out at constant temperature - Isothermal process. Cyclic process - $\Delta E = 0$, $\Delta H = 0$

84. **(3)**

If the unpaired electron is zero, then the complex will be a diamagnetic complex.

85. **(4)**

Higher alpha hydrogen increases the stability of carbocation. +M group always stabilize the carbocation. Tertiary carbocation is more stable than secondary and primary carbocation.

86. **(2)**

$\frac{VD_1}{VD_2} = \frac{2}{9}$, As V.D. $= \frac{M}{2}$, (M = Molar Mass)

$\frac{\left(\frac{M_1}{2}\right)}{\left(\frac{M_2}{2}\right)} = \frac{2}{9}$

87. **(4)**

$$CH_3CH_2OH \xrightarrow{P+I_2} \underset{(A)}{CH_3CH_2I} \xrightarrow[Ether]{Mg}$$

$$\underset{(B)}{CH_3CH_2MgI} \xrightarrow{HCHO} H-\underset{H}{\overset{CH_2CH_3}{\underset{|}{\overset{|}{C}}}}-OMgI \xrightarrow{H_2O}$$

(C)

$$H-\underset{H}{\overset{CH_2CH_3}{\underset{|}{\overset{|}{C}}}}-OH$$

(D)

n–Propylalcohol

88. **(1)**

Wherever we have multiple bonds are addition polymers and where its not present are the condensation polymer

89. **(3)**

(A) Natural rubber – Polymer of isoprene

(B) Neoprene – Polymer of chloroprene

(C) Buna N – Polymer of 1, 3 butadiene and acrylonitrile

(D) Buna S – Polymer of 1, 3 butadiene and styrene

90. **(2)**

They are identical as both chain and functional groups attached are similar.

91. **(3)**

The assertion is correct, but the reason is incorrect

92. **(3)**

Higher the value of 'a', more attraction and thus easy liquefaction.

93. **(4)**

The diameter of the dispersed phase particle should be almost similar to the wavelength used.

94. **(1)**

P is benzene diazonium chloride, Q is phenol and Q undergoes into Reimer-Tiemann reaction.

95. **(3)**

$B(OH)_3$ take one OH^- ion and act as monobasic Lewis acid.

96. **(4)**

For acidic buffer $pH = pK_a + \log\left[\frac{salt}{acid}\right]$

$$pH = 4.5 + \log\frac{[salt]}{[acid]}$$

As HA is 50% ionized so [salt] = [acid]

$\therefore$ pH = 4.5

$\therefore$ pH + pOH = 14

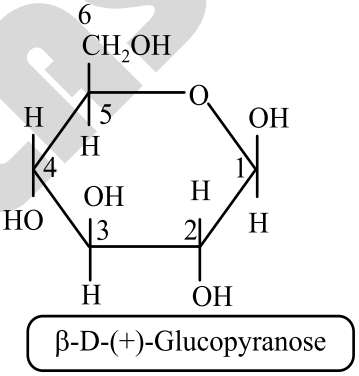
pOH = 14 – pH = 14–4.5 = 9.5

97. **(4)**

Copper pyrites $\rightarrow CuFeS_2$.

98. **(4)**

Carbon numbers 1, 2, 3, 4, and 5 are chiral



β-D-(+)-Glucopyranose

99. **(2)**

(i) In the very first step, bromination takes place at ortho position to the methyl group.

(ii) After the formation of B, reduction of NO_2 group happens to produce amine group

(iii) In presence of $NaNO_2$ and HCl, the amine group gets converted to diazonium chloride(BDC); This reaction is known as diazotization reaction ;

(iv) In the last step, Sandmeyer reaction takes place to the final product that is ortho para bromine substituted toluene.

100. **(2)**

H_2O is a polar solvent and like dissolves like;

Cl_3CCHO interacts with water

SECTION – III (BOTANY)

101. (3)
The amount of carbon fixed during photosynthesis by all produces in the ecosystem is gross primary productivity.

102. (4)
$$\underset{\text{lichens} \rightarrow \text{mosses} \rightarrow \text{grasses} \rightarrow}{\overset{\text{stages of succession}}{\overline{\qquad\qquad\qquad\qquad}}}$$
$\rightarrow$Shrubs$\rightarrow$Trees

103. (4)
The term biodiversity is popularised by Edward Wilson .

104. (1)
Keystone species deserves protection because they play an important role in supporting other species

105. (1)

106. (1)
Hepatitis -B is not a waterborne disease.

107. (2)
Biopesticide$\rightarrow$Bt
Root nodules $\rightarrow$ mycorrhiza
Diptheria$\rightarrow$ gal ghotu
Blood cholesterol lowering agent ------*Monascus purpurens*.

108. (2)
BOD = 0 (Pure water)
BOD high $\rightarrow$Highly polluted water

109. (1)
Pusa Gaurav is hybrid variety of rapeseed mustard

110. (4)
Taylor and colleagues perfumed Radioactive thymidine experiments on *Vicia faba*

111. (2)
The process of copying genetic information from one strand of DNA into RNA is termed as Transcription

112. (3)
(A) Structure gene $\rightarrow$ codes for protein
(B) Regulator Gene $\rightarrow$ Codes for repressor Molecule
(C) Promotor site $\rightarrow$ Binding site For RNA Polymerase.
(D) Operator site $\rightarrow$ Binding site for Repressor

113. (1)
Monosomy is another type of aneuploidy in which there is a missing chromosome

114. (3)
The abnormal gene responsible for haemophilia is carried on the X chromosome. Haemophilia is an X-linked recessive hereditary disorder

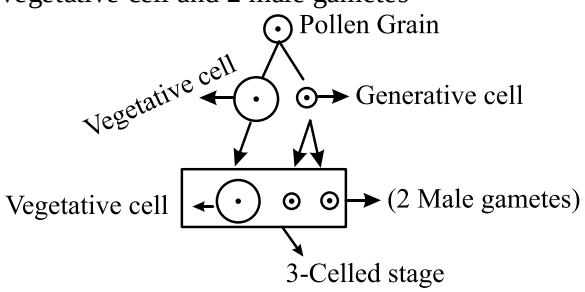
115. (4)
In Polygenic inheritance, many genes control Single character.

116. (3)
Genes located very close to one another on same Chromosome tend to transmitted together and are called linked-genes.

117. (2)
A) *Penicillium*$\rightarrow$Conidiospores
B) Rose plant $\rightarrow$ Stem cutting
C) *Spirogyra*$\rightarrow$ Zoospores
D) *Solanum tuberosum*$\rightarrow$ Stem tubers

118. (4)
ISOGAMY $\rightarrow$ ⊙ ⊙
(Similar gametes)
ANISOGAMY $\rightarrow$ ⊙ ⊙~
(Dissimilar gametes)
similar gametes $\rightarrow$ Isogamy
dissimilar gametes
$\rightarrow$Oogamy (anisogamy)

119. (2)
3-Celled Stage of Pollen grain consist of I vegetative cell and 2 male gametes



120. (4)
Tapetum is associated with synthesis of callase enzyme, Transportation of nutrients, pollen wall formation.

121. (2)
The following phenomenon is chemotropism (pollen tube formation)

122. (1)
During fertilisation pollen tube usually enters the embryo sac through micropyle

123. (2)
In some bacteria small bristle like fibres sporting out cell which aid in attachment are **fimbriae**.

124. (1)
Size of Ribosomes varies from 15 nm – 20nm.

125. (1)

126. (2)
A → Outer membrane
B → Matrix
C → Crista

127. (1)

128. (1)
Lysine and arginine are basic amino acids they contain amino group than acidic group

129. (2)
Interphase Include G_1 Phase (cell Growth)
S Phase (DNA Synthesis)
G_2 Phase (Cell Growth)

130. (3)
A → Metaphase
B → Transition to Metaphase
C → Late Prophase
D → Early Prophase

131. (1)
To Produce 1998 Seeds, we required 1988 pollen grains
1 Pollen Mother cell → 4 Pollen grain
× ← 1988 Pollen grain
$x = 1988 \times \frac{1}{4}$ = 497 P.M.C

132. (3)
Mitosis is characterized by Equal division also called Equational division.

133. (4)
During Anaphase I of meiosis homologous Chromosomes Separate.

134. (4)

135. (4)
Wood formed during winter Season is called autumn wood (or) late wood

136. (3)
Phelloderm is also called as secondary cortex

137. (3)
A → Parental Placentation
B →Axile Placentation
C → Marginal Placentation

138. (3)
Sweet Pea (*Lathyrus*) belongs to Fabaceae and is an ornamental plant

139. (1)
Belladonna belongs to family Solanaceae and is medicinal plant.

140. (1)

141. (3)
Leaf tip tendrils are present in *Gloriosa superba*.

142. (1)

143. (3)
Gemmae are unsexual bodies of Liver Worts.

144. (4)
In **Rhodophyceae** major pigments Presents are **chlorophyll a**, **d**

145. (1)

146. (4)
Cuscuta, venus fly trap and, bladder wart are insectivorous plants.

147. (4)
Yeast belongs to class Ascomycetes

148. (1)
(A) Viroids→ T.O. Diener
(B) Prions → Cr-Jacob disease

(C) Crystallography technique of viruses→W. M Stanley
(D) Poisonous fluid → Pasteur D.J Ivanowsky.

149. (3)

Trypanosoma is a flagellated Protozoan

150. (3)
Fabaceae belongs to order fabales.

SECTION – IV (ZOOLOGY)

151. (2)
They have circular mouth without Jaws.
They bear 6-15 pairs of gills.

152. (3)
NCERT XI, Pg. No. 46,50,52,53

153. (2)
Textual based question

154. (1)
NCERT Pg. # 104

155. (2)

156. (2)
NCERT–XI, Pg. # 110

157. (2)
Both assertion and reason are correct but reason is not the correct explanation of assertion

158. (4)
If oxyntic cell blocked protein will not digested

159. (1)
Image based question

160. (2)
Textual based question

161. (1)
NCERT XII Pg.# 00

162. (1)
NCERT–XI, Pg#279, 18.1.2

163. (2)
NCERT XI Pg.No.282

164. (2)
NCERT–XI, Pg#287, 288

165. (2)
NCERT-XI, [E] Pg#317, [H] Pg#317

166. (3)
Somatic nervous system is called voluntary nervous system

167. (4)
NCERT XI Pg.No.324

168. (3)
NCERT XI, Page No. 324

169. (1)
NCERT XI Pg.No.327

170. (2)
H zone also decrease in length during muscle contraction

171. (3)
Thyrocalcitonin regulate calcium level.

172. (1)
Vasopressin stimulates reabsorption of water and reduction of urine secretion. Vasopressin is also called ADH.

173. (2)
NCERT Pg.# 333

174. (2)
Image based question

175. (2)
NCERT Pg.# 46

176. (2)
Both assertion and reason explain about male accessory duct and gland are true but reason is not the explanation of assertion

177. (3)
Textual based question

178. (4)
Progesterone is required for maintaining the pregnancy

179. (2)
NCERT-XII, Para-3, Page-64

180. (2)
Both A and R are correct and R is the correct explanation of A

181. (3)
Brunner gland are found in submucosa of duodenum

182. (2)
NCERT XII (E) Pg. 128, 140

183. (3)
NCERT XII (E) Pg. 135, 3rd pare.

184. (2)
DNA ligase is also known as molecular glue

185. (2)
Textual based question

186. (1)
The Process of RNA interference has been used in development of plant resistant to nematodes

187. (3)
Textual based question

188. (2)
Ostia → spongocoel → osculum → exterior

189. (1)
In Ctenophora offspring is produced sexually and development is indirect

190. (3)
NCERT XI, Pg. # 103

191. (2)
Textual based question

192. (2)
Protein coated fat globules are called chylomicrons which are transported into lacteal in villi

193. (4)
Occupational respiratory disorder causes serious lung damage

194. (4)
Textual based question

195. (1)
Textual based question

196. (4)
NCERT XII (Bio)_Pg-155

197. (1)
Image based question

198. (4)
Finches are vegetarian and insect eating

199. (1)
NCERT XII Pg # 199, 200, 203, 209

200. (1)
Image based question