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NEET- 2024

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R ANSWER KEY & SOLUTION KEY FINAL ROUND - 02 (PCB) Dt.03.04.2024

BOTANY

SECTION - A (35 Questions)

01. **(1)** (NCERT XI Pg.236, 14.7)
02. **(3)** [NCERT XI Pg. No. 216, 13.7.1 and page no. 219 2nd paragraph]
03. **(3)** (NCERT XII, Pg 80, 5.3.1, based on Law of Independent Assortment)
04. **(4)** (NCERT XII, Pg 101, 6.2.1)
05. **(2)** (NCERT 12th, Page No-29, Paragraph- 2, Line No- 7 to 10)
06. **(4)** (NCERT 12th, Page No-21, Paragraph- 2, Line No- 9 to 11)
07. **(3)** (NCERT XII, Pg 89- 90. Based on sex linkage)
08. **(4)** (NCERT page no.38 gymno.concept)
09. **(2)** (11Th NCERT Page no.28 to 29, conceptual)
10. **(2)** (NCERT page no. 34 ,3.2 concept)
11. **(1)** (11th, para10.4 ,page no. 167)
12. **(4)** [NCERT XI, Page 248, Point 15.4.3.1]
13. **(4)** (NCERT XI Page No. 77, sub-topic 5.7.2)
14. **(4)** (12th NCERT,Page no.246 fig.14.2)
15. **(4)** (12th NCERT old page no.243 3rd para)
16. **(2)** (NCERT 11th, Page No-11, Table-1.1)
17. **(3)** (NCERT XII, Pg 75, Para 1, Line 4)
18. **(4)** (NCERT XII, Pg 78, Dihybrid cross based)
19. **(1)** (11th, para 10.1.1, Figure 10.1, page no. 163)
20. **(4)** (NCERT 11th, Page No-18, Figure 2.1)
21. **(3)** (NCERT 11th, Page No- 22, Paragraph-2, Line No- 4,5)
22. **(1)** (NCERT 11th, Page No-19, Paragraph- 2.1.2, Line No-27,28)
23. **(2)** [NCERT Page no. 87 (Point 6.1.2.2), 88 (Line number- 01-20), 90 (Line no. 01-03)]
24. **(1)** (NCERT 12th, Page No-35, Paragraph- 2.4.2, Line No- 13-15)
25. **(3)** (NCERT XI Page No. 75, sub-topic 5.5.1.3 & added family)
26. **(3)** (NCERT XII, Pg118, Para-5 , Line-1)
27. **(2)** (NCERT XII, Page No. 109, Para 3, Line 5-6)
28. **(4)** (NCERT XII, Pg 102, Figure 6.5 The Hershey-Chase experiment)
29. **(1)** [NCERT XI, Page 248 (First paragraph), 249 (Last paragraph)]
30. **(3)** (11th, para 8.2, page no. 126)
31. **(3)** (11th, para 8.4.1, 8.4.2, page no. 128,129)
32. **(4)** (NCERT XI added Family by NMC)
33. **(3)** (NCERT XI Pg.230, 14.3)
34. **(4)** [NCERT XI Pg. No. 222, 13.10]
35. **(2)** [NCERT class XI, Page no. 93, Point no. 6.3.4]

SECTION - B (Attempt Any 10 Questions)

36. **(4)** (NCERT XII, Pg 111, Para 2)
37. **(1)** (11th, para 10.2.1, page no. 164) (11th, para 8.5.1, page no. 131)
38. **(2)** (NCERT XII, Pg 91, 5.8.3)
39. **(4)** NCERT page no.38 ,1st para, 1st line
40. **(2)** (NCERT 11th, Page No-9, Paragraph- 1.3.3, Line No-31,32)
41. **(4)** [NCERT Page no. 89, Second paragraph]
42. **(4)** (NCERT XI Page No. 80, sub-topic 5.9.2)
43. **(2)** (NCERT XI Pg.233, Fig.14.4)
44. **(4)** (11th, para 8.3, page no. 127)
45. **(3)** [NCERT XI Pg. No.210, 13.4, fig 13.3a based]
46. **(4)** (NCERT XII, Pg.101, Para 5, Line 2)
47. **(4)** (11th, para 8.4.1,8.5.7, 8.5.6, 8.5.9, page no.126, 136,137)
48. **(4)** (NCERT 12th, Page No-23, Paragraph- 2, Line No- 15-17)
49. **(3)** (NCERT XII, Pg. 78 , Para 1, Line 4)
50. **(3)** (NCERT 11th, Page No-22, Last Paragraph, Line No-27,28)

ZOOLOGY

SECTION - A (35 Questions)

51. **(2)** (NCERT 11th page 119, para3, line)
52. **(3)** (NCERT Pg.No.284- Cardiac cycle)
53. **(1)** (NCERT XI Page No. 294, 6th paragraph)
54. **(4)** (NCERT 12th, p.no. 52, para 1)
55. **(2)** (NCERT 12th, p.no. 53, para 1, line 1)
56. **(1)** (NCERT 12th, p.no. 43, para 3)
57. **(1)** (NCERT12th p.no. 59)
58. **(3)** (NCERT11th page no 112, para 1, line 6)

59. **(3)** (NCERT Pg.No.153 - Immune system)
60. **(4)** (NCERT Pg.No.156 - Cancer)
61. **(3)** (NCERT Pg. No.-146)
62. **(3)** [NCERT P. No.309 3rd line below Diagram]
63. **(2)** [NCERT P. No.321 1st para last 3 lines]
64. **(1)** [NCERT P. No.318 Para Below Diagram]
65. **(4)** [NCERT P. No.212 3rd para]
66. **(1)** (NCERT Pg.No.-274)
67. **(1)** (NCERT Pg. No.-161)
68. **(2)** [NCERT P. No.311 Last line of Pelvic Girdle para]
69. **(1)** [NCERT P. No. 213- 3rd Point, P No 201- 2nd para , 11.3 & 11.3.1,]
70. **(4)** [NCERT P. No. 213- 2nd ,3rd & 4th Point]
71. **(1)** [NCERT P. No.311 1st Para]
72. **(2)** (12th, para 10.4 , page no.185/zoology.)
73. **(1)** (12th, para10.2.3 , page no.183/zoology.)
74. **(2)** (12th ncert 10.1 BIOTECHNOLOGICAL APPLICATIONS IN AGRICULTURE)
75. **(2)** (NCERT Pg.No. 272- Lung Volumes)
76. **(3)** (NCERT page no.260, fig.15.1)
77. **(4)** (NCERT XI Chapter chemical co-ordination conceptual)
78. **(1)** (NCERT 12th, Page No-130, 1st Paragraph, Line No- 7 to 9)
79. **(3)** NCERT 12th, Page No-135, 3rd Paragraph, Line No- 5,6
80. **(3)** (Old 12th NCERT page no.232 1st para.)
81. **(3)** (NCERT XI Page No. 47, 4.1.2)
82. **(1)** (NCERT XI Page No. 51, 4.2.4)
83. **(1)** (NCERT XI Page No. 55, table 4.1)
84. **(3)** (NCERT 11th, Page No- 143, Table- 9.1)
85. **(1)** (NCERT 11th, Page No- 151, 1st Paragraph, Line No-1 to 12)

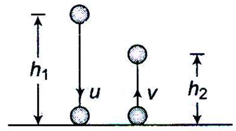
SECTION - B (Attempt Any 10 Questions)

86. **(4)** (NCERT12th p.no.64, para 3, LINE 5)
87. **(2)** (NCERT12th p.no. 57, para 2,line4)
88. **(1)** (NCERT 11th, Page No-148, Figure- 9.2, Conceptual)
89. **(4)** (NCERT 12th, Page No-127, Last Paragraph, Line No- 1,2 and 3)
90. **(3)** (NCERT page no.259; 2nd para)
91. **(4)** (12th NCERT, Page no.230 to 231)
92. **(1)** [NCERT P. No.317 1st para first 4 lines]
93. **(1)** NCERT 12th, Page No-140, 2nd Paragraph, Line No- 5 to 8
94. **(3)** (NCERT11th, page 101, para3, line 2)
95. **(3)** (NCERT Pg. No.158)
96. **(2)** [NCERT P. No.198 3rd para]
97. **(4)** (NCERT Pg.No.284- Cardiac cycle)
98. **(4)** [NCERT Practical Syllabus P. No.125 4th Point and last Para]
99. **(4)** (NCERT XI Page No. 293, 2nd paragraph)
100. **(3)** (NCERT XI Page No. 340, first paragraph)

PHYSICS

SECTION - A (35 Questions)

101. **(2)**



$$u=\sqrt{2gh_1},\ v=\sqrt{2gh_2}$$
$$\Delta p=m(v+u)$$
$$=m(\sqrt{2gh_2}+\sqrt{2gh_1}).$$

102. **(3)** As CD = 2 AB, latent heat of vaporization is twice the latent heat of fusion.
$\therefore$ Statement (3) is false. All other statements are correct.

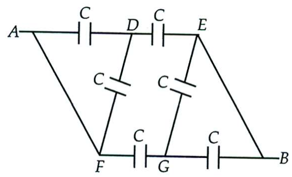
103. **(4)** $X = 3YZ^2$
$$\therefore\ [Y]=\frac{[X]}{[Z^2]}=\frac{[M^{-1}L^{-2}T^4A^2]}{[MT^{-2}A^{-1}]^2}=[M^{-3}L^{-2}T^8A^4]$$

104. **(1)** According to Wien's displacement law
$$\lambda_m\propto\frac{1}{T}\Rightarrow\lambda_{m_2}<\lambda_{m_1}\qquad(\because T_1<T_2)$$
Therefore, $I-\lambda$ graph for T_2 have lesser wavelength (λ_m) and so curve for T_2 will shift towards left side.

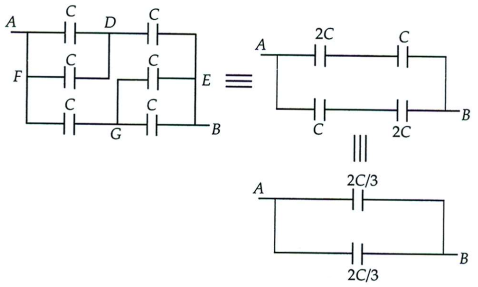
105. **(3)** $U=nC_VT$
$$\Rightarrow U=n_1C_{V_1}T+n_2C_{V_2}T$$
$$=8\times\frac{3R}{2}\times T+6\times\frac{5R}{2}\times T$$
$$=27RT.$$

106. **(2)** $h=R\cos\theta=12\times\frac{2}{3}cm$

107. **(3)**



The equivalent circuit diagrams are as shown in the figure below.



The equivalent capacitance between A and B is

$$C_{AB} = \frac{2C}{3} + \frac{2C}{3} = \frac{4C}{3}$$

108. **(2)** When cube is of side a and point charge Q is at the center of the cube then the total electric flux due to this charge will pass evenly through the six faces of the cube. So, the electric flux through one face will be equal to 1/6 of the total electric flux due to this charge.

Flux through 6 faces $= \frac{Q}{\epsilon_0}$

$\therefore$ Flux through 1 face, $= \frac{Q}{6\epsilon_0}$

109. **(1)** $v_d = \frac{e}{m} \times \frac{V}{l}\tau$ or $v_d = \frac{e}{m} \cdot \frac{El}{l}\tau$ (since $V = El$)

$\therefore\ v_d \propto E$

110. **(1)** $B = \frac{E}{v}$

$$= \frac{600\text{V}}{3\times10^{-3}m} \times \frac{1}{2\times10^{6}\text{ms}^{-1}}$$

$= 10^{-1}$ T $= 0.1$ T

111. **(1)** Magnetic field inside the hollow metallic cylinder

$B_{in} = 0$, and magnetic field outside it $B_{out} \propto \frac{1}{r}$

112. **(2)** Eddy currents may be reduced by using laminated core of soft iron.

113. **(3)** $I = \frac{V}{X_C}$ in Pure Capacitor

$$= \frac{V}{\frac{1}{2\pi fc}} = V2\pi fc \qquad \Rightarrow I \alpha f$$

114. **(4)** (A)$\to$(2) ; (B)$\to$(1) ; (C)$\to$(4) ; (D)$\to$(3)

115. **(1)**

116. **(3)**

117. **(4)** Mass defect $= \frac{B.E.}{c^2}$

Mass of nucleus = Mass of proton + mass of neutron – mass defect.

118. **(1)**

119. **(2)**

120. **(2)** As current is flowing from A to B, therefore, moving from A to B,

$$V_A - V_B = [5\times1 - 15 + 5\times10^{-3}\times(-10^3)] = -15 \text{ volt}$$

$\therefore\ V_B - V_A = 15$ V

121. **(1)** Wave function should be in the form $y = f(x, t)$
For travelling wave y should be linear function of x and t and they must exist as $(x \pm vt)$.
$y = A\sin(15x - 2t)$

122. **(4)** Speed of light does not depend on the motion of source as well as intensity.

123. **(4)** For telescope
Tube length $(L) = f_o + f_e = 60$

and magnification $(m) = \frac{f_o}{f_e} = 5 \Rightarrow f_o = 5f_e$

$\therefore\ f_o = 50$ cm and $f_e = 10$ cm
Hence focal length of eye-piece, $f_e = 10$ cm.

124. **(4)** Let μ_0 = Mass of body in vacuum
Weight of body in air
= Weight of standard weights in air

$$\therefore \mu_0 g - \left(\frac{\mu_0}{d_1}\right)dg = Mg - \frac{M}{d_2}dg$$

or $$\mu_0 = \frac{M\left(1 - \frac{d}{d_2}\right)}{\left(1 - \frac{d}{d_1}\right)}$$

Hence, the correct answer is option (4)

125. **(2)** $\lambda_{med} = \frac{\lambda_{vaccum}}{\mu}$

and we know that fringe width $\beta = \frac{\lambda D}{d}$

Therefore, $\beta_{med} = \frac{\beta_{vacuum}}{\mu} = \frac{12}{4/3} = 9$ mm

126. **(1)**

127. **(3)** Two particles will meet at their centre of mass
$\therefore$ Distance of the centre of mass from 8 kg mass

$$= \frac{8\times0 + 4\times12}{8+4} = 4m.$$

128. **(2)** Zero error is positive because CS division is ahead of pitch scale making.
Least count =

$$\frac{\text{Pitch}}{\text{No. of divisions on circular scale}}$$

$= \dfrac{0.5mm}{50} = 1\times10^{-5}$ m

$= 10\ \mu$m.

129. **(2)** When a child sits on a rotating disc, no external torque is introduced. Hence the angular momentum of the system is conserved. But the moment of inertia of the system will increase and as a result, the angular speed of the disc will decrease to maintain constant angular momentum.**(2)**

130. **(2)** $[\tau] = [ML^2T^{-2}]$

$$\frac{\Delta\tau}{\tau}\times100 = \frac{\Delta M}{M}\times100 + 2\frac{\Delta L}{L}\times100 + 2\frac{\Delta T}{T}\times100$$

$= 5\% + 2\times5\% + 2 + 5\%$

$= 25\%$

131. **(1)**

132. **(2)** $\vec{r} = at^2\hat{i} + bt\hat{j}$ ...(i)

$x = at^2$ ...(ii)

and $y = bt$

From Eq. (ii) put value of t in Eq. (i)

$x = \dfrac{a}{b^2}y^2$

133. **(4)**

134. **(1)** As we know, momentum, $\vec{p} = mv$

Change in P can be brought by changing force $\vec{F}$ i.e.

As, $\vec{F} = \dfrac{dp}{dt}$ rate of change of momentum with time.

$\Rightarrow$ as $\Delta p = F\Delta t$ = impulse so for same F and Δt, Δp will be same even for different bodies.

135. **(4)** Work done, $W = \int F\cdot dy = \int_0^1 (20+10y)dy$

$= \left[20y + \dfrac{10}{2}y^2\right] = 20 + \dfrac{10}{2} = 25$ J

SECTION - B (Attempt Any 10 Questions)

136. **(2)** Max. KE of a particle in SHM

$= \dfrac{1}{2}kr^2 = \dfrac{1}{2}\times200\times1^2 = 100$J

As total energy = Max. KE + Minimum PE

$\therefore$ 150 = 100 + minimum PE

or Minimum PE = 150 – 100 = 50 J

Thus, both, Statement I and Statement II are false.

137. **(4)** Let h be the height of liquid surface in the vessel. The velocity of efflux is given by

$v_{eff.} = \sqrt{(2gh)}$

If H be the height of table, then

$H = \dfrac{1}{2}gt^2$ or $t = \sqrt{(2H/g)}$

$\therefore R = v_{eff}\times t = \sqrt{2gh}\sqrt{2H/g}$

$R^2 = 4hH$ or $h = \dfrac{R^2}{4H}$

Hence, the correct answer is option (4)

138. **(1)** $x = -3t^3 + 18t^2 + 16t$

$v = -9t^2 + 36t + 16$

$a = -18t + 36$

$a = 0$ at $t = 2s$

$v = -9(2)^2 + 36\times2 + 16$

$v = 52$ m/s

139. **(1)** $y = 2\sin(\omega t - kx)$

Maximum particle velocity A ω

Wave velocity $= \dfrac{\omega}{k}$

$\dfrac{\omega}{k} = A\omega$

$k = \dfrac{1}{A} = \dfrac{2\pi}{\lambda}$

$\lambda = 2\pi A = 4\pi$ cm

140. **(1)** As refractive index, $\mu = \dfrac{\sin\left(\dfrac{A+D_{max}}{2}\right)}{\sin\dfrac{A}{2}}$

As angles of prism is constant, $D_{min} \propto \mu$

$\because \mu_b > \mu_r$, *hence* $D_2 > D_1$.

141. **(2)**

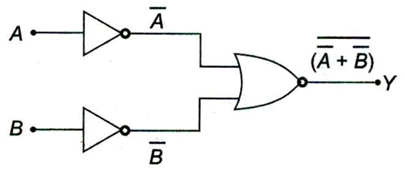
142. **(3)** $i = \dfrac{E_{eq}}{r_{eq}} = \dfrac{8\times5}{8\times0.2}$

$I = 25$ A

$V = E - ir$

$= 5 - 0.2\times25 = 0$ V

143. **(1)**



A	B	$\overline{A}$	$\overline{B}$	$\overline{A}+\overline{B}$	$\overline{\overline{A}+\overline{B}}$
0	0	1	1	1	0
0	1	1	0	1	0
1	0	0	1	1	0
1	1	0	0	0	1

144. **(2)** As, $U = kx^4 ; F = -\frac{dU}{dx} = -4kx^3$ ......(i)

In SHM, $x = r\sin\omega t$ and $\frac{d^2x}{dt^2} + \omega^2 x = 0$

Acceleration $A = \frac{d^2x}{dt^2} = -\omega^2 x$

$\therefore \; F = mA = -m\omega^2 x$ ......(ii)

From (i) and (ii) ;

$$4kx^3 = m\omega^2 x$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{2x}\sqrt{\frac{m}{k}} = \frac{\pi}{(r\sin\omega t)}\sqrt{\frac{m}{k}} \text{ or } T \propto \frac{1}{r}.$$

145. **(1)** Common potential, $V = \frac{C_1V_1 + C_2V_2}{C_1 + C_2}$

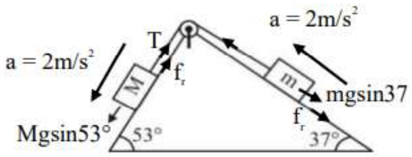
$$= \frac{(4\times10^{-6})\times80 + (6\times10^{-6})\times30}{4\times10^{-6} + 6\times10^{-6}} = 50\,\text{V}$$

$\therefore$ Energy lost by a 4 μF capacitor is

$$= \frac{1}{2}C_1V_1^2 - \frac{1}{2}C_1V^2 = \frac{1}{2}C_1(V_1^2 - V^2)$$

$$= \frac{1}{2}\times(4\times10^{-6})\times\{(80)^2 - (50)^2\} = 7.8\times10^{-3}\,\text{J} = 7.8\,\text{mJ}$$

146. **(2)**



For M block

10 g sin 53° – μ (10g) cos 53° – T = 10 × 2

T = 80 – 15 – 20

T = 45 N

For m block

T – mg sin 37° – μmgcos37° = m × 2

45 = 10 m

m = 4.5 kg

147. **(3)** $f = kx = Mg$

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

$\Rightarrow \; kx = 2mg$

$\Rightarrow \; \text{Mg} = 2mg \quad \Rightarrow m = \frac{M}{2}$

148. **(4)** According to Einstein's photoelectric equation

$K_{max} = hv - \phi$

$eV_s = \frac{hc}{\lambda} - \phi_0 \Rightarrow V_s = \frac{hc}{\lambda e} - \frac{\phi_0}{e}$

where, λ - Wavelength of incident light

ϕ_0 - Work function

V_s - Stopping potential

According to given problem,

$V_1 = \frac{hc}{\lambda e} - \frac{\phi_0}{e}$ ....(i)

$V_2 = \frac{hc}{(\lambda/2)e} - \frac{\phi_0}{e}$

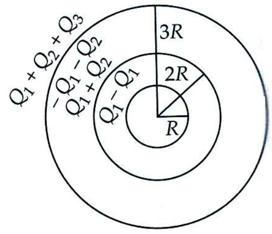
$V_2 = \frac{2hc}{\lambda e} - \frac{\phi_0}{e} = \frac{2hc}{\lambda e} - \frac{2\phi_0}{e} + \frac{2\phi_0}{e} - \frac{\phi_0}{e}$

$= 2\left(\frac{hc}{\lambda e} - \frac{\phi_0}{e}\right) + \frac{\phi_0}{e}$

$V_2 = 2V_1 + f_e$ [Using eqn. (i)]

$\therefore \; V_2 > 2V_1.$

149. **(2)** The charge distribution in the surfaces of the concentric spherical shells is shown in the figure.



Charge density, $\sigma = \frac{\text{Charge}}{\text{Area}}$

Since the surface charge densities are equal

$\therefore \; \frac{Q_1}{4\pi R^2} = \frac{Q_1 + Q_2}{4\pi(4R^2)} = \frac{Q_1 + Q_2 + Q_3}{4\pi(9R^2)}$

$Q_1 = \frac{Q_1 + Q_2}{4}$ ...(i)

and $Q_1 = \frac{Q_1 + Q_2 + Q_3}{9}$ ...(ii)

From (i), we get $3Q_1 = Q_2$ ...(iii)

From (ii) we get

$8Q_1 - Q_2 = Q_3$

$8Q_1 - 3Q_1 = Q_3$ Using (iii)

$5Q_1 = Q_3$

$\therefore \; \frac{Q_1}{1} = \frac{Q_2}{3} = \frac{Q_3}{5}$ or $Q_1 : Q_2 : Q_3 = 1:3:5$

150. **(3)** The gravitational field due to the ring at a distance $\sqrt{3}r$ is given by

$$E = \frac{Gm(\sqrt{3}r)}{[r^2 + (\sqrt{3}r)^2]^{3/2}} \Rightarrow E = \frac{\sqrt{3}Gm}{8r^2}$$

Attractive force $= \sqrt{3}\frac{GMm}{8r^2}$.

CHEMISTRY

SECTION - A (35 Questions)

151. **(1)**
F_2 has lower bond dissociation energy than Cl_2 due to strong inter-electronic repulsions.

152. **(2)**
Only Xe reacts with F_2 because it has the lowest ionisation enthalpy HNO_3.

153 . **(1)**
A – B interaction is stronger than A – A and B – B

154. **(4)**
(1)-(iii); (2)-(iv); (3)-(ii); (4)-(i)

155. **(1)**
The order of boiling points of the isomeric amines is as follows.
Primary amines > secondary amines > tertiary amines.
Boiling point $\propto$ surface area of the molecule.

156. **(2)**
$H_2C{=}CH_2$ Hofmann's product is the major product.

157. **(4)**
A-4, B-3, C-2, D-1

158. **(3)**
C.N. of E in complex is 6 and oxidation state is x + 0 – 2 – 1 = 0 ; x = 3

159. **(1)**
Condition for precipitation is
$K_{IP} > K_{sp}$
When equal volume mixed concentration become half also, for ppt,
$[Ag^+][Cl^-] > K_{sp}$

160. **(1)**
Conc. of HCl = 0.25 mole
Conc. of NaOH = 0.25 mole
Heat of neutralization of strong acid by strong base = – 57.1 kJ
$HCl + NaOH \rightarrow NaCl + H_2O - 57.1$ kJ
1 mole of HCl neutralise 1 mole of NaOH, heat evolved = 57.1 kJ
$\therefore$ 0.25 mole of HCl neutralise 0.25 mole of NaOH
$\therefore$ Heat evolved = 57.1 $\times$ 0.25 = 14.275 kJ

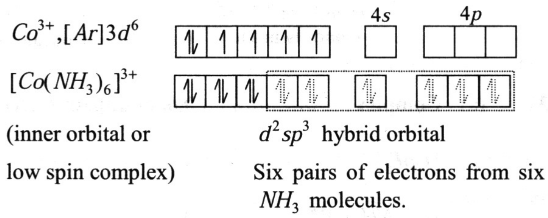
161. **(4)**
Since aniline gets protonated in strongly acidic medium, the lone pair of electrons are not available to produce mesomeric or electrometric effect. Thus, aniline becomes less reactive.

162. **(2)**

$^-CCl_3$ > $C_6H_5\bar{C}H_2$ > $(CH_3)_2\bar{C}H$ > $(CH_3)_3\bar{C}$

-ve charge highly dispersed due to -I effect; -M effect delocalises -ve charge; +I effect of CH_3 group intensifies the -ve charge

163. **(4)**
(1) $[Co(NH_3)_6]^{3+}$: The cobalt ion is in +3 oxidation state with $3d^6$ configuration and thus is diamagnetic octahedral complex, $[Co(NH_3)_6]^{3+}$ and has the electronic configuration represented as shown below.



(2) $[Zn(NH_3)_6]^{2+}$: Because of $3d^{10}$ configuration no (n–1) orbital is available for d^2sp^3 hybridisation and thus forms outer orbital complex. The complex is diamagnetic.
(3) $[Ti(NH_3)_6]^{3+}$: $3d^1$ configuration and thus has one unpaired electron.
(4) $[Cr(NH_3)_6]^{3+}$: The complex is inner orbital complex but $3d^3$ configuration has three unpaired electrons with weak as well as with strong field ligand.

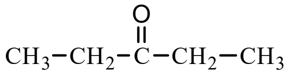
164. **(2)**
Zr and Hf have nearly same atomic radius as well as ionic radius. They have similar physical and chemical properties.

165. **(3)**
It may involve increase or decrease in temperature of the system. Systems in which such processes occur, are thermally insulated from the surroundings.

166. **(4)**
(1) O.N. of Cl in Cl^- = – 1
(2) O.N. of Cl in ClO^- = x – 2 = – 1 or x = + 1
(3) O.N. of Cl in ClO_2^- = x + 2 × (–2) = – 1 or x = + 3
(4) O.N. of Cl in ClO_3^- = x + 3 × (–2) = – 1 or x = + 5

167. **(3)**
Iodoform test is given by compounds which have CH_3CO group.

$CH_3-CH_2-CH_2-C(=O)-CH_3$
2-pentanone



3-pentanone

∴ 2-pentanone has CH_3CO group, so it gives iodoform test, while 3-pentanone does not have CH_3CO group, so it does not give iodoform test.

168. **(4)**

2-ethyl pent-3-en-1-al

169. **(3)**

When alkaline $KMnO_4$ (oxidising agent) is treated with KI, iodide ion is oxidised to

$$2\ IO_3^- + 2KMnO_4 + H_2O + KI \longrightarrow 2MnO_2 + 2KOH + KIO_3$$

170. **(3)**

$$H_2^+ = \sigma_{1s}^1 \qquad B.O. = \frac{1}{2}(1-0) = \frac{1}{2}$$

$$H_2^- = \sigma_{1s}^2\ \sigma_{1s}^{*1} \qquad B.O. = \frac{1}{2}(2-1) = \frac{1}{2}$$

Though both have same bond order, H_2^- is less stable because it has one electron in the higher energy and antibonding molecular orbital.

171. **(2)**

Wavelength of yellow light = 240 nm

$= 240 \times 10^{-9}$ m

Wave number

$$(\bar{\upsilon}) = \frac{1}{\lambda} = \frac{1}{240\times10^{-9}\,m} = 4.16\times10^{6}\ m^{-1}$$

172. **(3)**

In case of Hydrogenic species is:

1s < 2s = 2p < 3s = 3p = 3d

Hence 2s and 2p have same energy for Hydrogenic species.

173. **(1)**

Aldol reaction involves an aldehyde or ketone having an α-hydrogen atom This type of reaction occurs in presence of dilute base (i.e., dil NaOH). Only CH_3COCH_3 will give aldol reaction (Both HCHO and C_6H_5CHO lack α-hydrogen).

174. **(3)**

Carbon and hydrogen are estimated in organic compounds by Liebig's method

$$C + 2CuO \xrightarrow{\Delta} 2Cu + CO_2$$

$$2H + CuO \xrightarrow{\Delta} Cu + H_2O$$

Percentage of carbon and hydrogen is calculated from the weight of CO_2 and H_2 produced.

175. **(1)**

$NO^{\oplus} > NO > NO^{\ominus}$

176. **(1)**

TTT

177. **(4)**

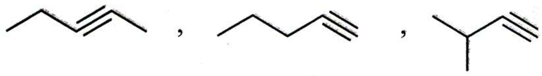
For the given reaction,

$$BrO_{3(aq)}^- + 5Br_{(aq)}^- + 6H^+ \rightarrow 3Br_{2(l)} + 3H_2O_{(l)}$$

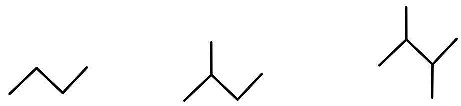
$$\text{rate} = \frac{1}{3}\frac{d[Br_2]}{dt} = -\frac{1}{5}\frac{d[Br^-]}{dt}$$

$$\therefore \frac{d[Br_2]}{dt} = -\frac{3}{5}\frac{d[Br^-]}{dt}$$

178. **(2)**



179. **(4)**



n-Butane 2-Methyl butane 2, 3-Dimethyl butane

180. **(3)**

Triads of group VIII (groups 8, 9 and 10) have approximately the same size e.g.

Ist triad, Fe, Co, Ni

IInd triad, Ru, Rh, Pd

IIIrd triad, Os, Ir, Pt

181. **(2)**

There is a high jump from IE_3 to IE_4. Therefore, it is difficult to remove the 4th valence electron. So, electronic configuration of element must have three valence electrons. Hence, the answer is (2).

182. **(1)**

The smaller the reduction potential of a substance, the more is its reducing power.

(Y > Z > X)

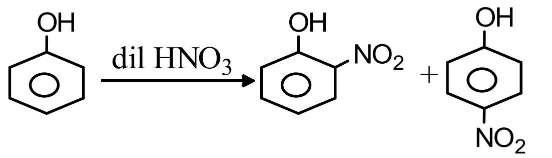
183. **(3)**

$$G^* = \frac{l}{a} = \frac{1.5\ cm}{0.75\ cm^2} = 2.0\ cm^{-1}$$

184. **(3)**

$NaBH_4$ does not reduces C = C bond.

185. **(2)**



(major) (minor)

SECTION - B (Attempt Any 10 Questions)

186. **(3)**

Vitamin	Deficiency disease
A. Vitamin-B_{12}	1. Pernicious anaemia
B. Vitamin-B_6	2. Convulsions
C. Vitamin-E	3. Sterility
D. Vitamin-K	4. Haemorrhagic condition

187. **(3)**
Conceptual fact.

188. **(4)**
$\overset{+3}{(CN)_2}(g) + 2OH^-(aq) \rightarrow \overset{+2}{C}N^-(aq) + \overset{+4}{C}NO^-(aq) + H_2O(l)$
Here, O.N. of C decreases from +3 in $(CN)_2$ to +2 in CN^- ion and increases from +3 in $(CN)_2$ to +4 in CNO^- ion. Thus, cyanogen is simultaneously reduced to cyanide ion and oxidised to cyanate ion. It is an example of a disproportion reaction.

189. **(1)**
The balanced equation involved in the titration may be given as :
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$
$[Fe^{2+} \rightarrow Fe^{3+} + e^-]6$
$Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \rightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$
$n_1 = 1 \quad n_2 = 6$

$$\frac{M_1V_1}{n_1}(Cr_2O_7^{2-}) = \frac{M_2V_2}{n_2}(Fe^{2+})$$

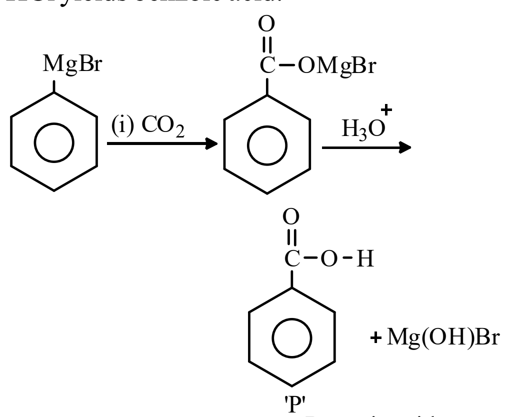
$$\frac{0.03 \times 20}{1} = \frac{M_2 \times 15}{6}$$

$$M_2 = \frac{0.03 \times 20 \times 6}{15} = 0.24$$

$$= 24 \times 10^{-2}$$

190. **(1)**
All ketones in (i), (iii) and (iv) contain abstractable alpha-proton while all aldehydes do not contain alpha-hydrogen.

191. **(2)**
Grignard reagent forms addition product with bubbled carbondioxide which on hydrolysis with HCl yields benzoic acid.



'P'
Benzoic acid

192. **(2)**
For 1 mole $Na_2CO_3 \rightarrow$ 1 mole CO_2 required.

$$n_{Na_2CO_3} \Rightarrow \frac{21200}{106} = 200\,\text{moles}.[M_{Na_2CO_3 = 106g/mole}]$$

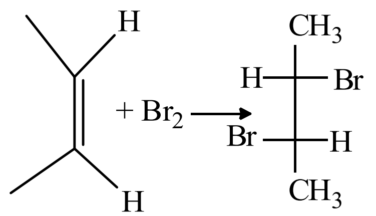
$\therefore$ For 200 moles $Na_2CO_3 \rightarrow$ 200 moles of CO_2 required & for 1 mole $CO_2 \rightarrow$ 1 mole $CaCO_3$ requred.
$\therefore$ For 200 mole $CO_2 \rightarrow$ 200 mole $CaCO_3$ req.
i.e. $\Rightarrow 200 \times (100)$ g $CaCO_3$ req. $\{m_{CaCo_3 = 100g}\}$
$\Rightarrow$ 20 Kg

193. **(2)**
Rate = k[A] $[B_2]$

But $\quad K = \frac{[A]^2}{[A_2]}$ or $[A] = \sqrt{K.[A_2]}$

Rate = $k.\sqrt{K}\sqrt{[A_2]}[B_2] = k'[A_2]^{1/2}[B_2]$

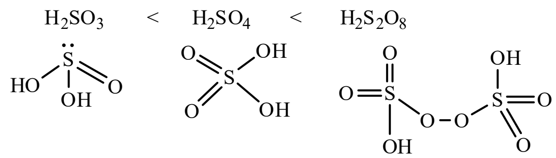
194. **(3)**



Cis
Racemic

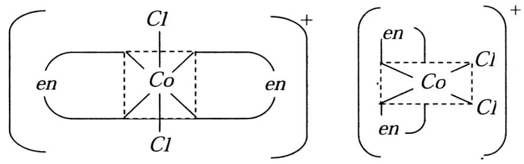
195. **(1)**
If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion

196. **(2)**



1 S = O   2 S = O   4 S = O

197. **(1)**
Complex of the type $[M(AA)_2X_2]$ or $[M(AA)_2XY]$ exhibit optical activity. $[CoCl_2(en)_2]^+$ forms geometrical isomers (cis and trans form). It is interesting to note that trans form does not show optical isomerism, i.e. it cannot be resolved into optical isomers. The reason is that the molecule has plane of symmetry. On the other hand, the cis-isomer is unsymmetrical and can be resolved into optical isomers.



trans-$[CoCl_2(en)_2]^+$ Optically inactive   *cis*-$[CoCl_2(en)_2]^+$ Optically active

198. **(4)**
$\Lambda^o_{m(NH_4Cl)} + \Lambda^o_{m(NaOH)} - \Lambda^o_{m(NaCl)}$

199. **(1)**
The value of K_{eq} is the measure of extent of reaction.
For most stable oxide $\Rightarrow K_{eq}$ should be minimum.

200. **(2)**
$(CH_3)_3CONa + C_2H_5Cl \rightarrow (CH_3)_3COC_2H_5$