ANSWER KEY FOR MOCK TEST- 7 (FOR 2020 ASPIRANTS) 6th April 2020

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

Solutions

1.(4) [Units and Dimensions]

Sol. $[bt^2] = [x] \Rightarrow (2) = LT^{-2}$.

2. **(4)[Motion in Two Dimension]**

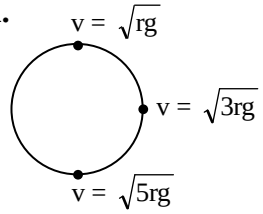
Sol. $t = \sqrt{\frac{2H}{g}}$

3. **(1)[Friction]**

Sol. μ_k depends upon nature of contact surfaces only

4. **(4) [Vertical Circular Motion]**

Sol.



5. **(2)[Collision]**

Sol. Loss in kinetic energy is converted into sound energy and heat .

6. **(2) [Rotational Motion]**

Sol $K.E. = \frac{1}{2} I\omega^2 = \frac{1}{2} (I\omega)(\omega)$

or $K.E. = \frac{1}{2} L\omega$

or $L = \frac{2K.E.}{\omega}$

Now $L' = \frac{2(2K.E.)}{(\omega/2)} = 4L$

7. (3) [Fluid Mechanics]

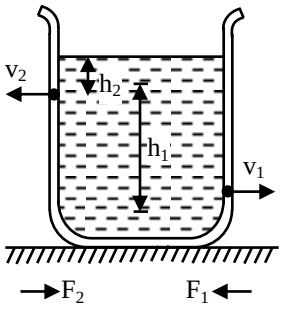
Sol. Thrust force

$F = F_1 - F_2 = \rho a v_1^2 - \rho a v_2^2$

$= \rho a (2gh_1) - \rho a (2gh_2)$

$= 2\rho ag (h_1 - h_2)$

$= 2 \rho agh$



8. **(2)[Viscosity]**

Sol. mass $= \frac{4}{3} \pi r^3 \times \rho$. so when mass become 8M so radius will become 2r & terminal velocity $V_t \propto r^2$ so it becomes 4 times of its previous value.

9. (3) **[Surface Tension]**

Sol. $h = \frac{2T\cos\theta}{rdg} \Rightarrow r_1 h_1 = r_2 h_2$

and $A = 2\ \pi\ r^2 \Rightarrow r\ \alpha\sqrt{A}$

$\therefore \sqrt{A_1}\ h_1 = \sqrt{A_2}\ h_2$

$\Rightarrow \sqrt{A}\ \times 4\ = \sqrt{\frac{A}{4}}\ \times h_2$

$\Rightarrow h_2 = 8$ cm

10. **(4)** **[Mechanical properties of solids]**

Sol. It is proportional limit so OA is correct

11. **(4)** **[SHM]**

Sol. $\Delta\phi = (\omega_1 - \omega_2)t = \left(\frac{2\pi}{T} - \frac{2\pi}{5T/4}\right) T = \frac{2\pi}{5}$

12. **(1)** **[Gravitation]**

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

$\therefore \frac{GM}{9R^2} = \frac{GM}{(R+h)^2}$

$\Rightarrow \quad 3R = R + h$

$\Rightarrow \quad h = 2R$

13. **(3)** **[Thermal Properties of Matter]**

Sol. For isotropic material

$\gamma = \alpha a + 2\alpha + 3\alpha = 6\alpha$

14. **(4)** **[Calorimetry]**

Sol. Heat released by water

$\Delta Q = 80 \times 1 \times 30 = 2400$ cal ……(i)

Mass of Ice melt

$2400 = m \times 80 \quad [\Delta Q = mL]$

$\therefore m = \frac{2400}{80} = 30$ gm

15. **(4)** **[Heat transfer]**

Sol. Water of lake gets cooled by convection till 4ºC after that it is cooled by conduction through ice.

16. (3) **[KTG]**

Sol. $\gamma_{mix} = \frac{\mu_1 C_{p_1} + \mu_2 C_{p_2}}{\mu_1 C_{v_1} + \mu_2 C_{v_2}}$

$= \frac{\left(1\times\frac{5}{2}R\right)+\left(2\times\frac{7}{2}R\right)}{\left(1\times\frac{3}{2}R\right)+\left(2\times\frac{5}{2}R\right)} = \frac{19}{13}$

17. **(4)** **[Thermodynamics]**

Sol. For adiabatic process

$P \propto T^{(\gamma/\gamma-1)}$ (i)

Given $P \propto T^3$ (ii)

From eq. (i) & (ii)

$\frac{\gamma}{\gamma-1}=3 \Rightarrow \gamma = 3\gamma - 3 \quad \Rightarrow \gamma = 3/2$

18. **(3)[Waves]**

Sol. n' = n as No relative motion.

19. **(2)[Motion in One Dimension]**

Sol. $x = 6t^2 - t^3$

$\frac{dx}{dt} = v = 12\,t - 3t^2$

$\frac{dv}{dt} = \frac{d^2x}{dt^2} = a = 12 - 6t$

$\frac{dv}{dt} = 0$ for v to be maximum

$12 - 6\,t \Rightarrow t = 2$ s

20. **(3) [Laws of Motion]**

Sol. $a = \frac{a_A + a_B}{2} = \frac{3+4}{2} = \frac{7}{2} = 3.5\ m/s^2$

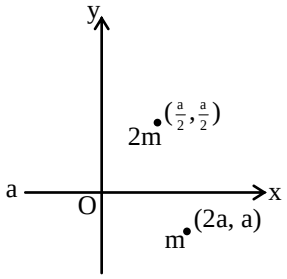
21. **(2) [WPE]**

Sol. $P = a + bt + ct^2$

$F = \frac{dP}{dt} = 0 + b + 2ct$

22. **(2)[COM]**

Sol.



$x_{cm} = \frac{2m \times \frac{a}{2} + m \times 2a}{3m} = a$ $\qquad$ $y_{cm} = \frac{2m \times \frac{a}{2} - ma}{3m} = 0$

23. **(2)[Rolling]**

Sol. Total energy, $K = K_R + K_T = \frac{1}{2} I\omega^2 + \frac{1}{2} mv^2$

$= \frac{1}{2}\left(\frac{2}{5}mr^2\right)\omega^2 + \frac{1}{2} mr^2 \omega^2 = \frac{1}{5}mr^2\omega^2 + \frac{1}{2} mr^2 \omega^2 = \frac{7}{10} mr^2 \omega^2$

Now, rotational kinetic energy, $K_R = \frac{1}{2} I \omega^2 = \frac{1}{5} mr^2 \omega^2$

$\therefore \frac{K_R}{K} = \frac{\frac{1}{5}mr^2\omega^2}{\frac{7}{10}mr^2\omega^2} = \frac{2}{7}$

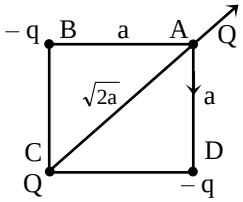
24. (4)[Electric Potential]

Sol. As we know conductor are equipotential,

$\therefore$ Ratio of potential is 1 : 1.

25. (1) [Electric Charges]

Sol.



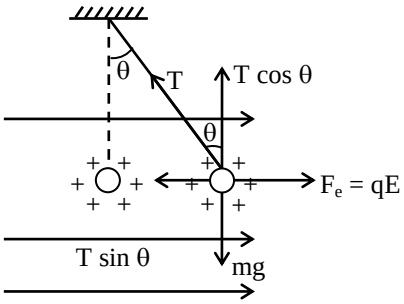
Since net force on charge Q is zero (Placed at corner A).

$$\frac{KQ^2}{(\sqrt{2}a)^2}+\left[\sqrt{2}\ \frac{kQq}{a^2}\right]=0$$

$$\Rightarrow \quad \frac{kQ^2}{2a^2}=\frac{-\sqrt{2}kQq}{a^2} \Rightarrow \quad \frac{Q}{q}=-2\sqrt{2}$$ So option (1) is correct.

26. **(3)[Electric field]**

Sol.



during equilibrium

$T\cos\theta = mg$

$T\sin\theta = qE$

$$T=\sqrt{(mg)^2+(qE)^2}$$

$$T=\sqrt{(80\times10\times10^{-6})^2+(2\times10^{-8}\times2\times10^4)^2}$$

$$T=\sqrt{64\times10^{-8}+16\times10^{-8}}$$

$$T=\sqrt{80\times10^{-8}}=8.8\times10^{-4}\ \text{N}$$

27. **(1)[Electrons and Photons]**

Sol. $n=\frac{P\lambda}{hc}$

Where n is number of photons per sec.

$$n_e = n\times\beta\ \% = \frac{P\lambda}{hc}\times\frac{\beta}{100}$$

$$n_e = \frac{1.5\times10^{-3}\times400\times10^{-9}}{6.6\times10^{-34}\times3\times10^8}\times\frac{0.1}{100}$$

$I = n_e e$

$= 0.48\ \mu A$

28. **(2) [Wave Optics]**

Sol. $n_1\lambda_1 = n_2\lambda_2$

$12\times600 = n_2\times400$

$n_2 = 18$

29. **(4)[AC]**

Sol. $i_0=\frac{v_0}{Z}$,

$$Z=\sqrt{R^2+(\omega L)^2}$$

$= \sqrt{4^2 + (1000 \times 3 \times 10^{-3})^2} = 5\ \Omega$

$i_0 = \frac{4}{5}$

$i_0 = 0.8A$

30. **(3) [EMW]**

Sol. Cathode rays is a beam of electrons emitted from the cathode of a high-vacuum tube.

31. **(2)[Ray Optics]**

Sol. Total deviation $\delta = 180^o$

$\delta = 360^o - 2\theta$

θ is angle between two plane mirror

$180 = 360 - 2\theta$

$\theta = 90^o$

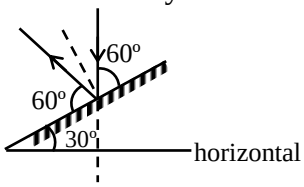
32.

(3)[Ray Optics]

Sol. Grazing angle with incident ray = 90 – 30

= 60

so grazing angle with reflected ray = 60º



33. **(1)[Wave Optics]**

Sol. $\beta = \frac{D\lambda}{d}$

$\therefore\ 10\beta' = (5.5)\ \beta$

$10\ \lambda' \left(\frac{D}{d}\right) = 5.5 \frac{D\lambda}{d}$

$\therefore \frac{\lambda}{\lambda'} = \frac{10}{5.5} = \mu \therefore \quad \mu = 1.8$

34. (2)[Photoelectric effect]

Sol. $\frac{hc}{\lambda} = \frac{1}{2}mv^2 + \phi$

$\Rightarrow \phi = \frac{hc}{\lambda} - \frac{1}{2}mv^2$

$= \frac{1240}{400} - 1.68 = 1.41$ eV

35. **(2)[Atomic Physics]**

Sol. The mean ionization potential is a defined as the average energy needed to produce a pair of positive and negative ions, which the average of molecular binding energies.

36. **(3)[Nuclear Physics]**

Sol. Since γ-photons have energies of the order of MeV hence they are emitted in nuclear process because nuclear energy levels are of the order of MeV.

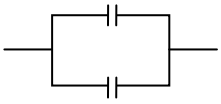
37. (3) [Semi conducting devices]

Sol. Here (A + B). C = Y

Output is available if A & C are available

38. **(2)[Capacitors]**

Sol. By using point potential method equivalent circuit is



$\therefore C_{eq} = \frac{2\epsilon_0 A}{d}$

39. **(1)[Current Electricity]**

Sol. $i = \frac{n(2e)}{t} = \frac{10000 \times 2 \times 1.6 \times 10^{-19}}{60}$

$= 0.5 \times 10^{-16}$ A

40. **(4)[Magnetism and Matter]**

Sol. From curie law $\chi \propto \frac{1}{T}$

41. **(3)[Current Electricity]**

Sol. $i = \frac{20}{4}$ amp.

42. **(2)[Magnetic effects of Electric current]**

Sol. D =diameter=2r = $\frac{2mv}{qB}$

$D \propto \frac{m}{q}$

Here $\frac{m}{q}$ is maximum for C^+.

43. **(3) [EMI]**

Sol. $F = I\ell B = \frac{vB\ell}{(R+r)}\ell B = \frac{vB^2\ell^2}{(R+r)}$

44. **(2) [EMI]**

Sol. $e = -\frac{d\phi}{dt} = -L\frac{dI}{dt}$

$\Rightarrow |e| = \frac{d\phi}{dt} = L\frac{dI}{dt} = L$ (slope of curve)

45. (3)[X rays]

Sol. $V = \frac{1240}{0.01} = 124000$ volt

Sr no.	Answer	Topic Name	Details	Easy (E), Medium (M) Difficult (D)
46	3	Morphology of flowering plants	XI, page no. 67, 5.1.1	E
47	4	Photosynthesis in higher plants	XI, page nos. 218 and 219, 13.8	M
48	4	Strategies for enhancement in food production	XII, page no. 177, 9.4	E
49	3	Microbes in human welfare	XII, Page no. 187, 2nd	E

			paragraph	
50	3	Transport in plants	XI, page nos. 176 and 177, 11.1.2	M
51	3	Anatomy of flowering plants	XI, page nos. 91,92 and 93, 6.3.3 and 6.3.4	M
52	3	Principles of inheritance and variation	XII, page no. 77, 5.2.2.2	E
53	3	Photosynthesis in higher plants	XI, page nos. 213,214 and 215, 13.6.3	M
54	3	Cell : The unit of life	XI, page no. 134, 8.5.3.3	M
55	3	Microbes in human welfare	XII, page no. 184,2nd last paragraph	E
56	3	The living world	XI, page nos. 9 and 10, 1.3.3, 1.3.4, 1.3.5 and 1.3.6	M
57	3	Anatomy of flowering plants	XI, page nos. 88 and 89, 6.2.1	E
58	4	Reproduction in organisms	XII, page no. 6, 1st paragraph	E
59	2	Principles of inheritance and variation	XII, page no. 89, 2nd paragraph	M
60	2	Molecular basis of inheritance	XII, page no. 97	E
61	1	Photosynthesis in higher plants	XI, page no. 220, 13.9	E
62	3	Plant kingdom	XI, page no. 36, 3.2.2	E
63	3	Cell: The unit of life	XI, page no. 134, 8.5.3.4	E
64	3	Strategies for enhancement in food production	XII, page nos. 173 (1st paragraph), 174 (table no. 9.1, last paragraph), 175 (table no. 9.2)	E
65	4	Cell cycle and cell division	XI, page nos. 167 and 168, 10.4	M
66	2	Morphology of flowering plants	XI, page nos. 73 and 78, 5.5 and 5.8	E
67	4	Mineral nutrition	XI, page nos. 201 and 202, 12.6.2	E
68	3	Environmental Issues	XII, page no. 273	E
69	3	Organisms and populations	XII, page no. 234 (ii. Competition)	M
70	3	Plant growth and development	XI, page no. 249, 15.4.3.2	E
71	4	Biological classification	XI, page no. 17, 1st paragraph	E
72	4	Cell: The unit of life	XI, page nos. 137 and 138, 8.5.9	M
73	3	Respiration in plants	XI, page nos. 231 and 232, 14.4.1	E
74	2	Sexual reproduction in flowering plants	XII, page no. 25	E
75	4	Molecular basis of inheritance	XII, page nos. 116 and 117, 6.8.1	E

76	3	Ecosystem	XII, page nos. 243 and 244, 14.3	E
77	2	Environmental issues	XII, page nos. 278 (16.3) and 279 (16.3.1)	E
78	1	Mineral nutrition	XI, page nos. 197 (12.2.2), 201 (12.6.1), 201 (12.6.2)	M
79	4	Biodiversity and conservation	XII, page no. 262, ii species-area relationships	E
80	1	Plant growth and development	XI, page no 250, 15.4.3.5	E
81	4	Molecular basis of inheritance	XII, page nos. 116, 117, 6.8.1	D
82	1	Sexual reproduction in flowering plants	XII, page no. 25	E
83	1	Respiration in plants	XI, page nos. 232 and 233, 14.4.2	M
84	4	Plant Kingdom	XI, overall full leason	E
85	1	Cell cycle and cell division	XI, page nos. 162, 163 and 164, 10.1.1	M
86	1	Ecosystem	XII, page nos. 242 and 243, 14.2	E
87	2	Organisms and populations	XII, page no. 231 (ii. Logistic growth)	E
88	4	Biodiversity and conservation	XII, page nos. 264 and 265 (causes of biodiversity losses)	E
89	4	Principles of inheritance and variation	XII, page no. 87, 5.5	E
90	1	Morphology of flowering plants	XI, page no. 71, 5.3.4	E
91	4	Plant growth and development	XI, page no. 252, 15.6	E
92	3	Sexual reproduction in flowering plants	XII, ploidy of syngergid and pollen grain is n, of nucellus is 2n and of endosperm is 3n, leaf cells are body cells and hence their ploidy is 2n	E
93	2	Respiration in plants	XI, page nos. 228, 229 and 230, 14.2	E
94	3	Transport in plants	XI, page no. 189, 11.5.1	E
95	2	Biological classification	XI, page no. 24, 2.3.3	M

96	NCERT, XI, Chapter 4, Page # 49, Section 4.2.1
97	NCERT, XI, Chapter 4, Page # 49, Figure 4.4
98	NCERT, XI, Chapter 4, Page # 50, Section 4.2.2
99	NCERT, XI, Chapter 4, Page # 57, Section 4.2.11.2; 4.2.11.3; 4.2.11.4
100	NCERT, XI, Chapter 7, Page # 102, Section 7.1.1, Figure 7.3
101	NCERT, XI, Chapter 7, Page # 103, Section 7.1.2
102	NCERT, XI, Chapter 7, Page # 112, Section 7.4.1

103	NCERT, XI, Chapter 9, Page #151, Section 9.8
104	NCERT, XI, Chapter 9, Page # 158, 159, Section 9.12.5
105	NCERT, XI, Chapter 16
106	NCERT, XI, Chapter 16, Page # 262, Section 16.2
107	NCERT, XI, Chapter 17, Page # 274, Section 17.4
108	NCERT, XI, Chapter 17 Page # 275, Section 17.4.2
109	NCERT, XI, Chapter 18, Page # 287, Section 18.5
110	NCERT, XI, Chapter 18
111	NCERT, XI, Chapter 19, Page # 296, Section 19.4
112	NCERT, XI, Chapter 19, Page # 297, Section 19.5
113	NCERT, XI, Chapter 20, Page # 304, Figure 20.1
114	NCERT, XI, based on Chapter 20, Section 20.4, Page # 312
115	NCERT, XI, Chapter 21, Page # 321 Section 21.4.1; 21.4.2 and 21.4.3
116	NCERT, XI, Chapter 21, Section 21.6.2
117	NCERT, XI, Chapter 21, Page # 324, Section 21.6.1.1
118	NCERT, XI, Chapter 22, Page # 335, Section 22.2.5
119	NCERT, XI, Chapter 22, Page #336, 337, Section 22.2.5
120	NCERT, XI, Based on Chapter 22, Page # 340, Section 22.4
121	NCERT, XII, Chapter 3, Page # 47, Section 3.3
122	NCERT, XII, Chapter 3, Page # 54, Section 3.6
123	NCERT, XII, Chapter 3, Page # 51-53, Section 3.5, Figure 3.11
124	NCERT, XII, Chapter 4, Page # 60, 61, Section 4.2
125	NCERT, XII, Chapter 4
126	NCERT, XII, Chapter 7, Page # 141, Section 7.9
127	NCERT, XII, Chapter 7, Page # 130-131, Section 7.3 and Figure 7.3 (a)
128	NCERT, XII, Chapter 8, Page # 149, Section 8.1
129	NCERT, XII, Chapter 8, Page #157, Section 8.4
130	NCERT, XII, Chapter 8, Page # 159, Section 8.5, Figure 8.9
131	NCERT, XII, Chapter 9, Page #168, Section 9.1.2
132	NCERT, XII, Chapter 11, Page #201, Section 11.3.1
133	NCERT, XII, Chapter 11, Page 204, 204, Section 11.3.6
134	NCERT, XII, Chapter 12, Page #209, Section 12.1
135	NCERT, XII, Chapter 12, Page #209, 210, Section 12.1

136. (2)

Six with C^{12} as $C^{12}O^{16}O^{16}, C^{12}O^{16}O^{17}, C^{12}O^{17}O^{17}, C^{12}O^{18}O^{18}, C^{12}O^{16}O^{18}, C^{12}O^{17}O^{18}$ and six with C^{13}.

137. (1)

2^{nd} excited state means third energy level.

$$E_3 = \frac{E_1}{3^2} = -\frac{13.6}{9} = -1.51 \text{ eV}$$

138. (4)

$$t = \frac{2.303}{\lambda}\log\frac{r_0}{r} \qquad (\because r_0 \propto N_0)$$

$$\text{or } 30 = \frac{2.303}{\lambda}\log\frac{28}{14}$$

$$\therefore \lambda = \frac{2.303}{30}\log 2 = \frac{2.303 \times 0.3010}{30}$$

Now, rate = λ.N

$$\therefore 28 = \frac{2.303 \times 0.3010}{30} \times N$$

$\therefore$ N = 1211 atoms

139 (4)

It will be safe to enter in the room when activity gets reduced by 10 times. i.e., when $N = N_0/10$

$$\because \frac{N}{N_0} = \left(\frac{1}{2}\right)^n \quad \text{or} \quad \frac{1}{10} = \left(\frac{1}{2}\right)^n$$

or $10 = 2^n$ $\quad \log 10 = n \log 2$

$$n = \frac{1}{0.301} = 3.32 \qquad t = n \times t_{1/2}$$

$= 3.32 \times 30 = 99.6$ days

140. (3)

$\frac{\Delta T_{fA}}{\Delta T_{fB}} = \frac{2}{1} = \frac{1}{1/2}$, i.e., B should associate to show higher ΔT.

141. (1)

$$\text{C.P.} \propto \frac{w}{m \times V}(1 - \alpha + x\alpha + y\alpha)$$

or $\text{C.P.} \propto C \times (1 - \alpha + x\alpha + y\alpha)$

for solute A_xB_y; α is degree of ionisation. Colligative properties are osmotic pressure, lowering in vapour pressure, elevation in b.pt. depression in f.pt.

142. (1)

$$A_xB_y \longrightarrow xA^{y+} + yB^{y-}$$

Before diss.	1	0	0
After diss.	$1-\alpha$	$x\alpha$	$x\alpha$

$i = 1 - \alpha + x\alpha + y\alpha$ or $(i-1) = \alpha(x + y - 1)$

$$\therefore \alpha = \frac{i-1}{(x+y-1)}$$

143. (4)

Energy of red P is lesser than white P and thus red P is more stable.

144. (4)

B.E. of S = O, C $\equiv$ C, C $\equiv$ N and N $\equiv$ N are 523, 839, 891 and 941 kJ mol^{-1} respectively.

145. (2)

$$\Delta H_{\text{combustion(carbon)}} = \Delta H_{(C_{(s)} \to C_{(g)})} + \Delta H_{O=O} - \Delta H_{C=O}$$

$= 538$ kJ mol^{-1}

Resonance energy = $\Delta H_{f\,(\text{experimental})} - \Delta H_{f\,(\text{calculated})}$

$= -393 - 538 = -931$ kJ mol^{-1}

$\Delta H_{C=O} = 339$ kJ mol^{-1}

$\Delta H_{O=O} = 498$ kJ mol^{-1}

$\Delta H_{\text{combustion}} = -393$kJ mol^{-1}

$\Delta H_{(C_{(s)} \to C_{(g)})} = 718$ kJ mol^{-1}

146. (3)

$$K = \frac{2.303}{t}\log\frac{C_0}{C} = \frac{2.303}{2\times10^4}\log\frac{800}{50}$$
$$= 1.38\times10^{-4}\,\text{sec}^{-1}$$

147. (2)

$$t_{1/2} = 69.3\text{sec}, \therefore K = \frac{0.693}{69.3} = 10^{-2}\,\text{sec}^{-1}$$

Now r = K [A] = $10^{-2}\times0.1 = 10^{-3}\,\text{M sec}^{-1}$

148. (1)

$$\text{pH} = -\log K_a + \log\frac{[\text{Salt}]}{[\text{Acid}]}$$

149. (1)

$$\text{pH} \; -\log K_a + \log\frac{[\text{Salt}]}{[\text{Acid}]}$$
$$= -\log10^{-4} + \log\frac{1}{1} = 4$$

Since $K_a \times K_b = 10^{-14}$

150. (4)

$$\lambda_C^\infty = \mu_C^\infty \times \text{faraday};$$
$$\lambda_\alpha^\infty = \mu_\alpha^\infty \times \text{faraday};$$

Also $\lambda_{\text{electrolyte}}^\infty = \lambda_\alpha^\infty + \lambda_C^\infty$

151. (1)

$$\lambda_{AgCl}^\infty = \lambda_{Ag^+}^\infty + \lambda_{Cl^-}^\infty = \lambda_{AgNO_3}^\infty + \lambda_{NaCl}^\infty - \lambda_{NaNO_3}^\infty$$

152. (3)
Theoretical

153. (1)
Theoretical

154. (4)
Theoretical

155. (4)
Theoretical

156. (1)
Theoretical

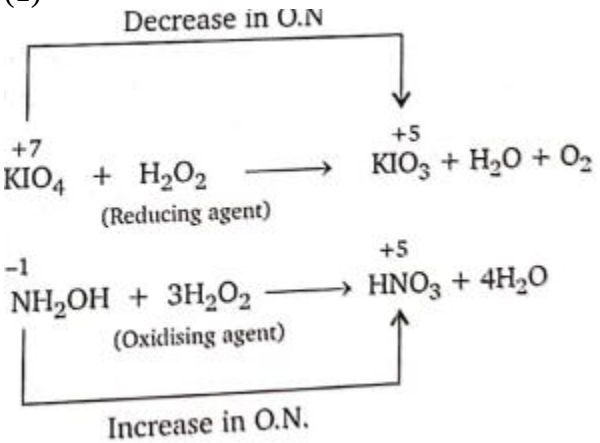
157. (1)
Theoretical

158. (4)
Theoretical

159. (2)
It contains Cs^+ and I_3^- ions.

160. (4)
The reducing agent oxidises itself,
(1) $H_2O_2^{-1} + 2H^+ + 2e^- \longrightarrow 2H_2O^{2-}$
(2) $H_2O_2^{-1} - 2e \longrightarrow O_2^0 + 2H^+$
(3) $H_2O_2^{-1} + 2e \longrightarrow 2\overset{2-}{O}H^-$
(4) $H_2O_2^{-1} + 2OH^- - 2e \longrightarrow O_2^0 + H_2O$

161. (1)

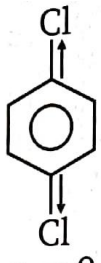


162. (1)
Theoretical

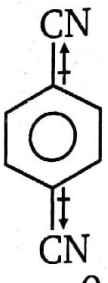
163. (1)
$Cu : [Ar]3d^{10}, 4s^1; Cu^+ : [Ar]3d^{10}; Cu^{2+} : [Ar]3d^9; Zn : [Ar]3d^{10}; Zn^+ : [Ar]3d^{10}, 4s^1; Zn^{2+} : [Ar]3d^{10}, 4s^2$
Removal of successive electron in Cu takes place from 4s and 3d-orbitals and thus due to change in major energy shell IP_2 values of Cu shows a jump. In Zn, the removal of successive electrons takes place from 4s-orbital and thus no jump in IP_2 values is noticed.

164. (1)
Nitric oxide is paramagnetic in the gaseous state as it has one unpaired electron in its outermost shell. The electronic configuration of NO is
$\sigma ls^2\sigma^* 1s^2\sigma 2s^2\sigma^* 2s^2\sigma 2p^2 z\{\pi 2p_x^2 = \pi 2p_y^2\}\pi^* 2p_x^1$
However, it dimerises at low temperature to become diamagnetic.
$2NO \rightleftharpoons N_2O_2$
Its bond order is 2.5 and it combines with O_2 to give nitrogen dioxide.

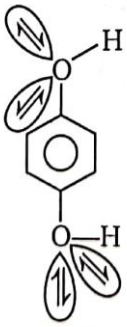
165. (4)



(a) $\mu = 0$



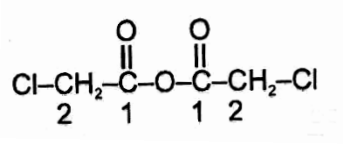
(b) $\mu = 0$



(c) $\mu \neq 0$

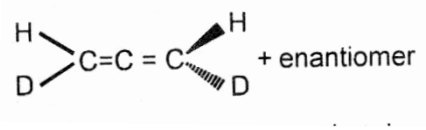
(d) $\mu \neq 0$

166. (3)



chloro acetic anhydride or chloro ethanoic anhydride

167. (3)



168. (2)

169. (4)

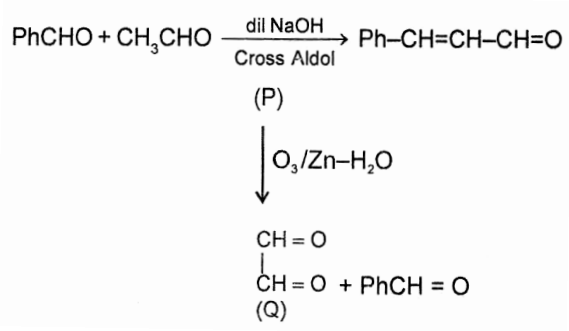
170. (3)
Conceptual

171. (3)

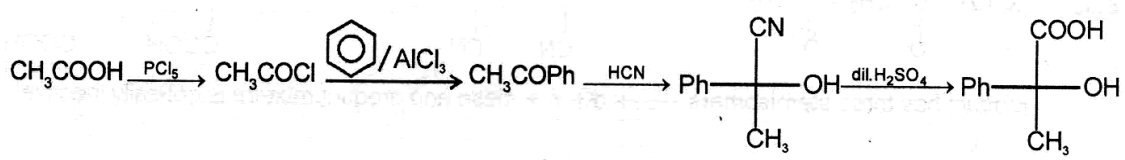
172. (2)
In presence of Bulky base, Hoffman alkene is formed

173. (2)

174. (4)



175. (1)



176. (2)

177. (2)
Aldehydes and x-hydroxy ketonesgive positive Tollen's test. Glucose has an aldehyde group and fructose is an -hydroxy ketones.

178. (4)

179. (2) Chloroamphenicol is a broad spectrum antibiotic

180. (2)