<p>|   | 1. (1) | 2. (3) | 3. (4) | 4. (1) | 5. (4) | 6. (3) | 7. (2) | 8. (Bonus) | 9. (1) | 10. (1) | 11. (2) | 12. (1) | 13. (3) | 14. (1) | 15. (4) | 16. (4) | 17. (4) | 18. (3) | 19. (2) | 20. (2) | 21. (2) | 22. (2) | 23. (2) | 24. (3) | 25. (2) | 26. (2) | 27. (3) | 28. (3) | 29. (1) | 30. (1) | 31. (2) | 32. (2) | 33. (2) | 34. (1) | 35. (2) | 36. (4) | 37. (4) | 38. (3) | 39. (3) | 40. (2) | 41. (3) | 42. (3) | 43. (2) | 44. (1) | 45. (2) | 46. (3) | 47. (1) | 48. (4) | 49. (3) | 50. (4) | 51. (4) | 52. (1) | 53. (4) | 54. (2) | 55. (2) | 56. (2) | 57. (1) | 58. (1) | 59. (1) | 60. (1) | 61. (3) | 62. (3) | 63. (2) | 64. (3) | 65. (3) | 66. (1) | 67. (1) | 68. (4) | 69. (1) | 70. (4) | 71. (4) | 72. (1) | 73. (3) | 74. (2) | 75. (1) | 76. (4) | 77. (4) | 78. (2) | 79. (2) | 80. (3) | 81. (2) | 82. (2) | 83. (3) | 84. (1) | 85. (2) | 86. (3) | 87. (4) | 88. (3) | 89. (3) | 90. (4) | 91. (1) | 92. (2) | 93. (3) | 94. (1) | 95. (3) | 96. (1) | 97. (3) | 98. (1) | 99. (1) | 100. (2) | 101. (4) | 102. (1) | 103. (4) | 104. (2) | 105. (1) | 106. (4) | 107. (1) | 108. (2) | 109. (3) | 110. (3) | 111. (3) | 112. (4) | 113. (3) | 114. (3) | 115. (4) | 116. (4) | 117. (2) | 118. (2) | 119. (4) | 120. (1) | 121. (4) | 122. (2) | 123. (1) | 124. (1) | 215. (1) | 126. (2) | 127. (2) | 128. (3) | 129. (3) | 130. (2) | 131. (1) | 132. (1) | 133. (2) | 134. (4) | 135. (2) | 136. (2) | 137. (3) | 138. (2) | 139. (1) | 140. (1) | 141. (2) | 142. (4) | 143 (4) | 144. (2) | 145. (1) | 146. (1) | 147. (1) | 148. (1) | 149. (1) | 150. (4) | 151. (1) | 152. (1) | 153. (3) | 154. (1) | 155. (1) | 156. (1) | 157. (1) | 158. (1) | 159. (1) | 160. (1) | 161. (3) | 162. (2) | 163. (3) | 164 (4) | 165. (3) | 166. (1) | 167. (1) | 168. (1) | 169. (1) | 170. (2) | 171. (4) | 172. (3) | 173. (3) | 174. (2) | 175. (3) | 176. (1) | 177. (1) | 178. (1) | 179. (3) | 180. (4) |</p>
<table>
<thead>
<tr>
<th>Sr No</th>
<th>Answer</th>
<th>Topic Name</th>
<th>Details</th>
<th>Easy, Medium Difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Morphology of flowering plant</td>
<td>XI pg no. 67, 5.1.1</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Photosynthesis in higher plant</td>
<td>XI pg no. 216,217 and 218, 13.7.2</td>
<td>M</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Enhancement in food production</td>
<td>XII pg no.177, 9.4</td>
<td>E</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Microbes in human welfare</td>
<td>XII pg no.183 and 184, 10.3</td>
<td>E</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>Transport in Plants</td>
<td>XI pg no. 180 and 181</td>
<td>M</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Anatomy of flowering plant</td>
<td>XI pg no. 90, 91 and 92, 6.3</td>
<td>D</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>Principles of inheritance and variation</td>
<td>XII pg no. 71,72, 73 and 74</td>
<td>E</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>Photosynthesis in higher plant</td>
<td>XI pg no. 208</td>
<td>E</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Cell: The unit of life</td>
<td>XI pg no. 140, 8.5.11</td>
<td>E</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Microbes in human welfare</td>
<td>XII pg no.187, 4th paragraph</td>
<td>E</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>The living world</td>
<td>XI pg no.10</td>
<td>E</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Anatomy of flowering plants</td>
<td>XI pg no. 93, 6.3.5</td>
<td>M</td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>Reproduction in organisms</td>
<td>XII pg no.7 and 8</td>
<td>E</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>Principles of inheritance and variation</td>
<td>XII pg no. 89 and 90</td>
<td>E</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>Molecular basis of inheritance</td>
<td>XII pg no. 121,122 and 123</td>
<td>E</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>Photosynthesis in higher plants</td>
<td>XI pg no. 213 and 214, 13.6.3</td>
<td>D</td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>Plant kingdom</td>
<td>XI pg no. 42 and 43</td>
<td>M</td>
</tr>
<tr>
<td>18</td>
<td>3</td>
<td>Cell: The unit of life</td>
<td>XI pg no. 138 and 139 8.5.10</td>
<td>M</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
<td>Enhancement in food production</td>
<td>XII pg no. 173, sngarcaige</td>
<td>E</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>Cell cycle and cell division</td>
<td>XI pg no. 164 and 165, 10.2</td>
<td>E</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>Morphology of flowering plants</td>
<td>XI pg no. 75, 5.5.1.3</td>
<td>M</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>Mineral Nutrition</td>
<td>XI pg no. 201,202,203 12.6.2</td>
<td>M</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>Environmental Issues</td>
<td>XII pg no. 274,276,282 and 283</td>
<td>M</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>Organisms and Populations</td>
<td>XII pg no. 230</td>
<td>E</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
<td>Biological Classification</td>
<td>XI pg no. 23,24</td>
<td>E</td>
</tr>
<tr>
<td>26</td>
<td>2</td>
<td>Plant growth and development</td>
<td>XI pg no.248,249,250,251,15.4.3</td>
<td>M</td>
</tr>
<tr>
<td>27</td>
<td>3</td>
<td>Cell: The unit of life</td>
<td>XI pg no.133 and 134, 8.5.3.2</td>
<td>E</td>
</tr>
<tr>
<td>28</td>
<td>3</td>
<td>Respiration in plants</td>
<td>XI pg no. 232 and 233 14.4.2</td>
<td>D</td>
</tr>
<tr>
<td>29</td>
<td>1</td>
<td>Sexual reproduction in flowering plants</td>
<td>XII pg no. 24 2\textsuperscript{nd} paragraph</td>
<td>E</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>Molecular basis of inheritance</td>
<td>XII pg no. 115, 3\textsuperscript{rd} paragraph</td>
<td>M</td>
</tr>
<tr>
<td>31</td>
<td>2</td>
<td>Ecosystem</td>
<td>XII pg no. 246, 2\textsuperscript{nd} paragraph</td>
<td>E</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
<td>Biodiversity and Conservation</td>
<td>XII pg no.267 last paragraph</td>
<td>E</td>
</tr>
<tr>
<td>33</td>
<td>2</td>
<td>Mineral nutrition</td>
<td>XI pg no. 197 and 198</td>
<td>E</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>Biodiversity and Conservation</td>
<td>XII pg no. 261 and 262 15.1.2 (i) and (ii)</td>
<td>M</td>
</tr>
<tr>
<td>35</td>
<td>2</td>
<td>Plant growth and development</td>
<td>XI pg no. 252</td>
<td>E</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>Molecular basis of inheritance</td>
<td>XII pg no. 106 and 107 6.4.2</td>
<td>M</td>
</tr>
<tr>
<td>37</td>
<td>4</td>
<td>Sexual reproduction in flowering plants</td>
<td>XII pg no. 30</td>
<td>E</td>
</tr>
<tr>
<td>38</td>
<td>3</td>
<td>Respiration in plants</td>
<td>XI pg no. 236 and 237 14.7</td>
<td>E</td>
</tr>
<tr>
<td>39</td>
<td>3</td>
<td>Plant Kingdom</td>
<td>XI pg no. 30 and 31 3.1</td>
<td>E</td>
</tr>
<tr>
<td>40</td>
<td>2</td>
<td>Cell cycle and cell division</td>
<td>XI pg no. 166, 10.2.5</td>
<td>E</td>
</tr>
<tr>
<td>41</td>
<td>3</td>
<td>Ecosystem</td>
<td>XII pg no. 248 and 249 fig 14.4(c)</td>
<td>M</td>
</tr>
<tr>
<td>42</td>
<td>3</td>
<td>Organisms and populations</td>
<td>XII pg no. 235 and 236</td>
<td>E</td>
</tr>
<tr>
<td>43</td>
<td>2</td>
<td>Biodiversity and conservation</td>
<td>XII pg no. 265 and 266 15.2.1</td>
<td>M</td>
</tr>
<tr>
<td>44</td>
<td>1</td>
<td>Principles of inheritance and variation</td>
<td>XII pg no. 88 5.6.2</td>
<td>E</td>
</tr>
<tr>
<td>45</td>
<td>2</td>
<td>Morphology of flowering plant</td>
<td>XI pg no. 71 5.3.4</td>
<td>E</td>
</tr>
<tr>
<td>46</td>
<td>3</td>
<td>Plant growth and development</td>
<td>XI pg no. 251 and 252, 15.5</td>
<td>E</td>
</tr>
<tr>
<td>47</td>
<td>1</td>
<td>Sexual reproduction in flowering plants</td>
<td>XII pg no. 35, 2.4.2</td>
<td>M</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>Respiration in plants</td>
<td>XI pg no. 231 14.4</td>
<td>E</td>
</tr>
<tr>
<td>49</td>
<td>3</td>
<td>Transport in plants</td>
<td>XI pg no. 190 11.5.2</td>
<td>E</td>
</tr>
<tr>
<td>50</td>
<td>4</td>
<td>Biological Classification</td>
<td>XI pg no. 25 and 26 2.6</td>
<td>E</td>
</tr>
</tbody>
</table>

53. Aquatic arthropods have gills or book gills and terrestrial have book lung or trochea
54. Nucleotidase cleaves nucleotide (S Phosphoester bond) to form nucleoside
55. Epithelial tissue mainly used for absorption and exchange of material
56. Lecithin in one of the phospholipid
57. In Hepatic portal system vein carries the nutrient from digestive system to the liver
58. During ventricular contraction deoxygenated blood right ventricle pumped into pulmonary artery and oxygenated blood from left ventricle pumped into aorta
59. Troponin is present irregularly on actin, troponyosin in present throughout the actin as wrapping actin helically
60. F-actin fibrous protein made up of G-monomer
61. PTH is parathormone, released by parathyroid gland it stimulated during low Ca\textsuperscript{++} in blood. It increases Ca\textsuperscript{++} by releasing from bone
62. Vegetative phase and juvenille phase in same
63. Seminiferous tubule in found in lobule of testes
64. Trophoblast in outer layer of blastocyst which forms the choronic placenta
65. Lactational amenorrhea is stop of menstrual cycle till cmance lactation
66. Thorn of bougenville & tendril of cucurbita in modified axillary bud
84. Normalizing selection in also called stabilizing selection
85. administration at vaccine comes under acquired active artificial immunity
87. Pathogen of elephantiasis transmits through culex mosquito
89. Bacillus thuringiensis from cry protein during spore formation
90. Lymphocytes have limited life span
91. (1) Dimension of \( \alpha [M^0L^0T^0] \) \( \therefore [\alpha] = [T^{-1}] \)
   Again \( \left[ \frac{v_0}{\alpha} \right] = [L] \) so \( [v_0] = [LT^{-1}] \)
92. (2) For vertically upward motion, \( h_1 = v_0 t - \frac{1}{2} g t^2 \)
   and for vertically down ward motion, \( h_2 = v_0 t + \frac{1}{2} g t^2 \)
   \( \therefore \) Total distance covered in \( t \) sec \( h = h_1 + h_2 = 2v_0 t \).
93. (3) Equation of trajectory for oblique projectile motion is
   \[ y = x \tan \theta - \frac{g x^2}{2u^2 \cos^2 \theta} \]
   Substituting \( x = D \) and \( u = v_0 \)
   \[ h = D \tan \theta - \frac{g D^2}{2u^2 \cos^2 \theta} \]
94. (1) \[ T = \frac{2m_1 m_2}{(m_1 + m_2)} \frac{(g + a)}{g} = \frac{2m_1 m_2 (g + g)}{m_1 + m_2} \]
   \( \Rightarrow T = \frac{4m_1 m_2}{m_1 + m_2} g = \frac{4w_1 w_2}{w_1 + w_2} \)
95. (3) \( \mu_k = \frac{F}{N mg} = \frac{19.6}{5 \times 9.8} = \frac{2}{5} = 0.4 \)
96. (1) By conservation of energy, \( mgh = \frac{1}{2} mv^2 \)
   \( \Rightarrow v = \sqrt{2gh} = \sqrt{2 \times 9.8 \times 1} = \sqrt{19.6} = 4.43 \text{ m/s} \)
97. (3) \( E = \frac{1}{2} mv^2 \). Differentiating \( w.r.t. x \), we get
   \[ \frac{dE}{dx} = \frac{1}{2} m \times 2v \frac{dv}{dx} = mv \times \frac{dv}{dt} \times \frac{dt}{dx} = mv \times a = ma \]
98. (1)
99. ANS: (1)
100. (2) 
\[ I = \left( \frac{M}{2} \right) \left( \frac{L}{2} \right)^2 + \left( \frac{M}{2} \right) \left( \frac{L}{2} \right)^2 = 2 \left( \frac{ML^2}{24} \right) = \frac{ML^2}{12} \]

101. (4) 
\[ KE_i + U_i = KE_f + U_f \]
\[ 0 + 0 = \frac{1}{2} mv^2 \left( 1 + \frac{k^2}{R^2} \right) - mg(3a) \]
\[ 3mga = \frac{3}{4} mv^2 \]
\[ v = \sqrt{4ga} \]

102. (1) Velocity of liquid through orifice, \( v = \sqrt{2gy} \)
and time taken by liquid to reach the ground
\[ t = \sqrt{\frac{2(h + h - y)}{g}} = \sqrt{\frac{2(2h - y)}{g}} \]
\[ \therefore \] Horizontal distance covered by liquid
\[ x = v.t. = \sqrt{2gy} \times \sqrt{\frac{2(2h - y)}{g}} = \sqrt{4y(2h - y)} \]
\[ \Rightarrow x^2 = 4y(2h - y) \]
\[ \Rightarrow \frac{d(x)^2}{dy} = 8h - 8y \]
for \( x \) to be maximum, \( \frac{d}{dy} (x^2) = 0 \)
\[ \therefore 8h - 8y = 0 \text{ or } h = y \]
So \( x_m = \sqrt{4h(2h - h)} = 2h \)

103. (4) Rate of flow under a constant pressure head,
\[ V = \frac{\pi r^4}{8\eta l} \Rightarrow V \propto r^4 \Rightarrow V_2 = \left( \frac{l_2}{l_1} \right)^4 \times \frac{V_1}{l_1} = \left( \frac{1}{2} \right)^4 \times \frac{V}{2} \]
\[ \Rightarrow V_2 = \frac{V}{32} = \frac{V}{32} \]

104. (2) Because if the length available is less than required, then water will rise up to available height
and adjust its radius of curvature.

105. (1) \[ Y \frac{FL}{A\Delta\ell} = \frac{1000 \times 100}{10^{-6} \times 0.1} = 10^{12} \text{ N/m}^2 \]

106. (4) \[ K = \frac{1}{2} mv^2 = \frac{1}{2} m \left( \frac{GM}{r} \right) \]
\[ \frac{K_A}{K_B} = \frac{r_B}{r_A} = \left( \frac{R + h_B}{R + h_A} \right) = \left( \frac{R + 2R}{R + R} \right) = \frac{3}{2} \]
107. (1) The forces that act on the block are \( qE \) and \( mg \). Since \( qE \) and \( mg \) are constant forces, the only variable elastic force changes by \( kx \). Where \( x \) is the elongation in the spring \( \Rightarrow \) unbalanced (restoring) force \( F = -kx \)

\[ -\omega^2X = -KX \Rightarrow \omega = \sqrt{\frac{k}{M}} \Rightarrow T = 2\pi \sqrt{\frac{M}{k}} \]

108. (2) If the sheet is heated then both \( d_1 \) and \( d_2 \) will increase since the thermal expansion of isotropic solid is similar to true photographic enlargement.

\[ \theta_w = \frac{L_v}{C_w} = \frac{100 - \frac{80}{\frac{1}{2}}} = 10^\circ C \]

109. (3) \[ \theta_{mix} = \frac{\theta_i + \theta_w}{2} = \frac{100 + \frac{80}{\frac{1}{2}}} = 10^\circ C \]

110. (3) If thermal resistance of each rod is considered \( R \) then, the given combination can be redrawn as follows

\[ (\text{Heat current})_{AC} = (\text{Heat current})_{AB} \]

\[ \frac{(120 - 20)}{2R} = \frac{(120 - 0)}{R} \Rightarrow \theta = 70^\circ C \]

111. (3) \[ W_{AB} = -P_0 V_0, \quad W_{BC} = 0 \quad \text{and} \quad W_{CD} = 4P_0 V_0 \]

\[ \Rightarrow W_{ABCD} = -P_0 V_0 + 0 + 4P_0 V_0 = 3P_0 V_0 \]

112. (4) \[ v_{rms} = \sqrt{\frac{3RT}{M}} \Rightarrow v_{rms} \propto \sqrt{\frac{T}{M}} \]

\[ \frac{v_2}{v_1} = \sqrt{\frac{M_1}{M_2}} \times \frac{T_1}{T_2} = \sqrt{\frac{1}{2}} \times \frac{1}{2} \Rightarrow v_2 = \frac{v_1}{2} = \frac{300}{2} = 150 \text{m/sec} \]

113. (3) Fundamental frequency of closed pipe

\[ n = \frac{v}{4\ell} = 220 \text{Hz} \Rightarrow v = 220 \times 4\ell \]

If \( \frac{1}{4} \) of the pipe is filled with water then remaining length of air column is \( \frac{3\ell}{4} \)

Now fundamental frequency = \( \frac{v}{4\left(\frac{3\ell}{4}\right)} = \frac{v}{3\ell} \) and

First overtone = \( 3 \times \) fundamental frequency

\[ = \frac{3v}{3\ell} = \frac{v}{\ell} = \frac{220 \times 4\ell}{\ell} = 880 \text{Hz} \]
114. (3) Flux coming out of the cube \( \phi_1 = \frac{\lambda \cdot a \sqrt{3}}{\varepsilon_0} \) ......(i)

and from sphere \( \phi_2 = \frac{\lambda \cdot 2a}{\varepsilon_0} \) ......(ii)

115. (4) To obtain net field \( 6E \) at centre \( O \), the charge to be placed at remaining sixth corner is \(-5q\).

116. (4) All capacitor lying in left side of line \( XY \) are short circuited so circuit can be reduced as follows

117. (2) Work done by the field \( W = q(-dV) = -e(V_A - V_B) \)

\[ W = e(V_B - V_A) = e(V_C - V_A) \quad (\because V_B = V_C) \]

\[ \Rightarrow (V_C - V_A) = \frac{W}{e} = \frac{6.4 \times 10^{-19}}{1.6 \times 10^{-19}} = 4V \]

118. (2) When switch \( S \) is open total current through ammeter.

\[ i = \frac{20}{3+2} = 4A \]

When switch is closed \( i = \frac{20}{3+5} = 5A \).

119. (4) Initially when wires carry currents in the same direction as shown. Magnetic field at mid point \( O \) due to wires 1 and 2 are respectively

\[ B_1 = \frac{\mu_0}{4\pi} \frac{2i_1}{x} \]

and \( B_2 = \frac{\mu_0}{4\pi} \frac{2i_2}{x} \)

Hence net magnetic field at \( O \) \( B_{net} = \frac{\mu_0}{4\pi} \frac{2}{x} \times (i_1 - i_2) \) ...... (i)
If the direction of $i_2$ is reversed then

$$B_1 = \frac{\mu_0}{4\pi} \frac{2i_1}{x}$$

and

$$B_2 = \frac{\mu_0}{4\pi} \frac{2i_2}{x}$$

So

$$B_{net} = \frac{\mu_0}{4\pi} \frac{2}{x} (i_1 + i_2)$$

\[\Rightarrow 40 \times 10^{-6} = \frac{\mu_0}{4\pi} \frac{2}{x} (i_1 + i_2) \quad \text{...... (ii)}\]

Dividing equation (ii) by (i)

$$\frac{i_1 + i_2}{i_1 - i_2} = \frac{4}{1} \Rightarrow \frac{i_1}{i_2} = \frac{5}{3}$$

120. (1) Point $P$ lies on equatorial line of magnet (1) and axial line of magnet (2) as shown

\[B_1 = \frac{\mu_0}{4\pi} \frac{M}{d^3} = 10^{-7} \times \frac{1000}{(0.1)^3} = 0.1 \text{T}\]

\[B_2 = \frac{\mu_0}{4\pi} \frac{2M}{d^3} = 10^{-7} \times \frac{2\times1000}{(0.1)^3} = 0.2 \text{T}\]

\[\therefore B_{net} = B_2 - B_1 = 0.1 \text{T}\]

121. (4) Induced emf $e = Bvl$ \[\Rightarrow e = Bv(2R) = \frac{2BvL}{\pi}\]

122. (2) $V_0 = i_0Z \Rightarrow 200 = 100Z \Rightarrow Z = 2\Omega$

Also $Z^2 = R^2 + X_L^2 \Rightarrow (2)^2 = (1)^2 + X_L^2 \Rightarrow X_L = \sqrt{3}\Omega$

123. (1) Crosses ($\times$) linked with the loop are decreasing, so induced current in it is clockwise $i.e.$ from $B$ \[\rightarrow A$. Hence electrons flow from plate $A$ to $B$ so plate $A$ becomes positively charged.

124. (1) The direction of EM wave is given by the direction of $\mathbf{E} \times \mathbf{B}$.

125. (1) By using $\frac{H_2 - H_1}{u} = \frac{H_2 - H_1}{R} s$

where $\mu_1 = \frac{4}{3}, \quad \mu_2 = 1, \quad u = -6 \text{cm}, \quad R = -10 \text{ cm}, \quad v = ?$

On putting values $v = -5.2 \text{ cm}$

126. (2) For TIR at $PO$; $\theta < C$

From geometry of figure $\theta = 60 \quad i.e. \quad 60 > C \Rightarrow \sin 60 > \sin C$

\[\Rightarrow \frac{\sqrt{3}}{2} > \mu_{\text{Liquid}} \Rightarrow \mu_{\text{Liquid}} < \frac{\sqrt{3}}{2} \times \mu_{\text{Prism}}\]

\[\Rightarrow \mu_{\text{Liquid}} < \frac{\sqrt{3}}{2} \times 1.5 \Rightarrow \mu_{\text{Liquid}} < 1.3.\]
127. (2) 

\[ I_2 = I_1 \cos^2 \theta = \frac{I_0}{2} \cos^2 \theta \]

\[ I_3 = I_2 \cos^2 (90 - \theta) = \frac{I_0}{2} \cos^2 \theta \sin^2 \theta \]

\[ = \frac{I_0}{8} (2 \sin \theta \cos \theta)^2 = \frac{I_0}{8} (\sin 2\theta)^2 \]

128. (3) Path difference at point \( \Delta = \frac{xd}{D} \)

Phase difference at point \( \Phi = \left( \frac{2\pi}{\lambda} \right) \left( \frac{xd}{D} \right) = \frac{2\pi x}{\beta} \)

Resultant intensity at point P is

\[ I_{\text{res}} = I_{\text{max}} \cos^2 \left( \frac{\Phi}{2} \right) \]

\[ = I_0 \cos^2 \left( \frac{\pi x}{\beta} \right) \]

129. (3) \( E = \frac{12375}{4000} = 3.09 \text{ eV} \)

Photoelectrons emits if energy of incident light > work function.

130. (2) \( \lambda_{\text{keV}} \propto \frac{1}{(Z-1)^2} \Rightarrow \frac{\lambda_{\text{Ni}}}{\lambda_{\text{Co}}} = \left( \frac{Z_{\text{Co}} - 1}{Z_{\text{Ni}} - 1} \right)^2 = \left( \frac{27 - 1}{28 - 1} \right)^2 \)

\[ \Rightarrow \lambda_{\text{Ni}} = \left( \frac{26}{27} \right)^2 \times \lambda_{\text{Co}} = \left( \frac{26}{27} \right)^2 \times 179 = 165.9 \text{ pm} < 179 \text{ pm} \]

131. (1) Energy of the electron, when it comes out from the second plate = 200 eV - 100 eV = 100 eV

Hence accelerating potential difference = 100 V

\( \lambda_{\text{Electron}} = \frac{12.27}{\sqrt{100}} \text{ Å} = \frac{12.27}{\sqrt{100}} = 1.23 \text{ Å} \)
132. (1) We know that 
\[ E_n = -13.6 \frac{Z^2}{n^2} \text{eV} \] and 
\[ r_n = 0.53 \frac{n^2}{Z} \text{Å} \]

Here for \( n = 1 \), \( E_1 = -54.4 \text{ eV} \)

Therefore 
\[ -54.4 = -13.6 \frac{Z^2}{1^2} \Rightarrow Z = 2 \]

Hence radius of first Bohr orbit 
\[ r = \frac{0.53(1)^2}{2} = 0.265 \text{Å} \]

133. (2) \( N = N_0 e^{-2t} \)
\[ \frac{N_A}{N_B} = \frac{N_0 e^{-52t}}{N_0 e^{-2t}} \]
\[ \frac{1}{e^2} = e^{-48t} \]
\[ 2 = 4\lambda t \]
\[ t = \frac{1}{2\lambda} \]

134. (4) Equivalent circuit can be redrawn as follows

```
    10 V
     | 2Ω
    14Ω 12Ω
     |     |
   i1  i2
```

\[ i = \frac{10}{2} = 5 \text{mA} = i_2 \]
\[ i_1 = 0 \]

135. (2) The given circuit can be redrawn as follows

```
    10Ω
  6Ω  3Ω
    |
  18Ω
```

\[ \frac{i_1}{i_2} = \frac{9}{18} = \frac{1}{2} \]

and \( i = i_1 + i_2 \)
\[ \Rightarrow \frac{i}{i_1} = 1 + \frac{i_2}{i_1} = 1 + 2 = 3 \]

From \( P = i^2R \Rightarrow \frac{P_{10Ω}}{P_{18Ω}} = \left( \frac{i}{i_1} \right)^2 \left( \frac{10Ω}{18Ω} \right) \Rightarrow P_{10Ω} = 10W \]

136. (2) \( E = \frac{hc}{\lambda} \)
137. \( \Rightarrow 9 \sigma \)
\( \Rightarrow 9 \pi \)

138. (2) \( \therefore \) NaF has highest M.P

139. (1) Fajan’s rules

140. (1) Due to small size and high polarising power of Li, \( \text{Li}_2\text{CO}_3 \rightarrow \text{Li}_2\text{O} + \text{CO}_2 \)

141. (2) \( \frac{z}{e} \frac{1}{\text{size}} \therefore \text{F}^- < \text{O}^{2-} < \text{N}^{3-} \)

142. (4) \( \text{NO}_2 \) is a reddish-brown gas.

143. \( \text{H}_3\text{P}_3\text{O}_9 \) (cyclic oxoacid)

144. (2) \( \text{CO} \) burns with a blue flame and is colourless
\( \text{CuO} + \text{CO} \rightarrow \text{Cu} + \text{CO}_2 \)

145. \( \left( P + \frac{a}{V}\right) V = RT \)
\( PV + \frac{a}{V} = RT \) (1)
\( \frac{PV}{RT} = 1 - \frac{a}{VRT} \)
\( Z = 1 - \frac{a}{VRT} \)

146. (1) \( \text{SO}_3^{2-} \rightarrow \text{SO}_4^{2-} + 2e^- \)
\( 5e^- + \text{MnO}_4^- \rightarrow \text{Mn}^{12} \)

147. (1) Number = \( \frac{5.6}{22.4} \times 6.02 \times 10^{23} = 1.5 \times 10^{23} \)
148. (1)\[ \text{Ag}_2\left(\text{CO}_3\right)_2(s) \rightleftharpoons 2\text{Ag}^+ + \text{CO}_3^{2-} \]

\[ k_F = \left(2a\right) \times 0.1 \]

\[ k_{sp} = 4a^2 \times 0.1 \]

\[ 4 \times 10^{-13} = 4a^2 \times 0.1 \]

\[ a = 10^{-6} \]

149. (1) Conjugate acid of \( \text{NH}_2 \)

\( = \text{NH}_3 \)

150. (4) Equilibrium with remain same

151. (1) \( k = Ae^{-E_a/RT} \)

152. (1)

153. (3) \[ E = -0.0591 \log \frac{C_1}{C_2} \]

\( E > 0 \) when \( C_2 > C_1 \)

154.

\[ ^{\text{NH}_4} + ^{\text{CH}_3\text{COOT}} + ^{\text{HCl}} - ^{\text{CH}_3\text{COOH}} \]

\[ = \left( 91 + 4.26 - 391 \right) \text{ mho cm}^{-2} \]

\[ = 126 \text{ mho cm}^{-2} \]

155. (1)

\[ ^{\text{H}_2\text{SO}_4} = ^{\text{H}_2^+} + ^{\text{SO}_4^{2-}} \]

(make them subscript)

156. (1) \( P_A = Y_A P_T \Rightarrow 0.35 \times 600 = 210 \)

\( P_A = P_A^0 X_A \Rightarrow P_A^0 = \frac{P_A}{X_A} = \frac{210}{0.7} = 300 \)

157. (1) unit cells = \( 2 \times 12.08 \times 10^{23} \)

\( \Rightarrow 24.16 \times 10^{23} \)
158. (1) not depends on path

159. (1) $\Delta n_s = -0.5$

160. (1) $A \rightarrow$ no symmetry

161. $\text{Ni(CO)}_4 \Rightarrow n = 0$

(3) $C \rightarrow \text{Ni(CN)}_4^2 \Rightarrow n = 0$

$[\text{NiCl}_4]^2^- \Rightarrow n = 2$

162. (2) Cr $\rightarrow$ 6, Fe $\rightarrow$ +3,

$V \rightarrow 5$, Mn $\rightarrow$ +7

163. (3) Forth floatation is based on wetting property of ore

164. (4) By catalyst no affect on equilibrium constant

165. (1) Only increases the rate of reaction

166. (1)

6-Ethyl-1-methyl cyclohex-1-en

$\text{OH and } \text{O}$

functional

167. (1)

$\text{O}^- > \text{NH}_2 > \text{OH} > \text{NHCOCH}_3$

168. (1) $\text{NO}_2 > \text{CN} > \text{COOH} > \text{Cl}$

169. (1) $\text{NaI/acetone (anti eternination)}$

170. (2)

$\text{NaI/acetone (anti eternination)}$
171. (4) In halides as size increases van der waal’s attractions increases.

172.

\[
\text{\begin{tikzpicture}
\node at (0,0) {\text{O}};
\node at (0,0.5) {\text{H}};
\node at (0,1) {\text{Me}};
\node at (0.5,0) {\text{Me}};
\node at (1,0) {\text{Me}};
\node at (1.5,0) {\text{Me}};
\node at (2,0) {\text{Me}};
\node at (2.5,0) {\text{Me}};
\node at (3,0) {\text{OH}};
\end{tikzpicture}}
\]

1. $\text{MeMgBr} + (2 \text{ equiv})$

2. $\text{H}_3\text{O}^+$

173.

\[
\text{\begin{tikzpicture}
\node at (0,0) {\text{C}};
\node at (0,0.5) {\text{C}};
\node at (0,1) {\text{C}};
\node at (1,0) {\text{OH}};
\node at (1.5,0) {\text{C}};
\node at (2,0) {\text{C}};
\node at (2.5,0) {\text{C}};
\node at (3,0) {\text{CHO}};
\end{tikzpicture}}
\]

$\text{Cu}/\Delta$ →

174. (2)

\[
\text{\begin{tikzpicture}
\node at (0,0) {\text{CH}_3};
\node at (0,0.5) {\text{AlCl}_3};
\node at (0,1) {\text{CH}_3\text{COCl}};
\node at (1,0) {\text{CH}_3};
\node at (1,0.5) {\text{CH}_3};
\node at (1,1) {\text{C=CH}_3};
\node at (2,0) {\text{Zn} / \text{Hg}};
\node at (2,0.5) {\text{HCl}};
\node at (3,0) {\text{KMnO}_4};
\node at (3,0.5) {\text{H}^+};
\node at (4,0) {\text{COOH}};
\node at (4,0.5) {\text{COOH}};
\end{tikzpicture}}
\]

175. (3) $\text{CO}_2$ evolved is from $\text{NaHCO}_3$

176.

\[
\text{\begin{tikzpicture}
\node at (0,0) {\text{OH}};
\node at (0,0.5) {\text{Me}};
\node at (0,1) {\text{Me}};
\node at (0.5,0) {\text{Me}};
\node at (1,0) {\text{Me}};
\node at (1.5,0) {\text{Me}};
\node at (2,0) {\text{Me}};
\node at (2.5,0) {\text{Me}};
\end{tikzpicture}}
\]

rearranges →

\[
\text{\begin{tikzpicture}
\node at (0,0) {\text{OH}};
\node at (0,0.5) {\text{Me}};
\node at (0,1) {\text{Me}};
\node at (0.5,0) {\text{Me}};
\node at (1,0) {\text{Me}};
\node at (1.5,0) {\text{Me}};
\node at (2,0) {\text{Me}};
\node at (2.5,0) {\text{Me}};
\end{tikzpicture}}
\]

177. (1) $\text{R-N} = \text{C} \xrightarrow{\text{H}_2\text{O}} \text{RNH}_2$

178. (1) Fact

179. (3) Fact

180. (4) Fact