

SOLUTIONS

NTSE PART TEST-1

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MENTAL ABILITY

- | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|
| 1. (B) | 2. (B) | 3. (B) | 4. (C) | 5. (D) | 6. (C) | 7. (C) |
| 8. (C) | 9. (D) | 10. (D) | 11. (B) | 12. (A) | 13. (A) | 14. (D) |
| 15. (B) | 16. (B) | 17. (B) | 18. (A) | 19. (D) | 20. (D) | 21. (C) |
| 22. (C) | 23. (A) | 24. (A) | 25. (B) | 26. (D) | 27. (C) | 28. (D) |
| 29. (B) | 30. (D) | 31. (C) | 32. (A) | 33. (C) | 34. (D) | 35. (B) |
| 36. (A) | 37. (D) | 38. (B) | 39. (B) | 40. (A) | 41. (D) | 42. (A) |
| 43. (B) | 44. (C) | 45. (D) | 46. (A) | 47. (B) | 48. (D) | 49. (B) |
| 50. (D) | | | | | | |

ENGLISH

- | | | | | | | |
|----------|---------|---------|---------|---------|---------|---------|
| 51. (A) | 52. (B) | 53. (A) | 54. (C) | 55. (A) | 56. (B) | 57. (C) |
| 58. (A) | 59. (C) | 60. (A) | 61. (D) | 62. (D) | 63. (C) | 64. (B) |
| 65. (A) | 66. (B) | 67. (D) | 68. (C) | 69. (B) | 70. (A) | 71. (A) |
| 72. (C) | 73. (D) | 74. (B) | 75. (C) | 76. (B) | 77. (C) | 78. (D) |
| 79. (A) | 80. (A) | 81. (D) | 82. (D) | 83. (A) | 84. (D) | 85. (D) |
| 86. (A) | 87. (D) | 88. (C) | 89. (D) | 90. (B) | 91. (B) | 92. (C) |
| 93. (A) | 94. (B) | 95. (A) | 96. (D) | 97. (C) | 98. (B) | 99. (C) |
| 100. (C) | | | | | | |

PHYSICS

101. (D)

$$\frac{t_A}{t_B} = \frac{\sqrt{\frac{2h_A}{g}}}{\sqrt{\frac{2h_B}{g}}} = \sqrt{\frac{16}{25}} = \frac{4}{5}$$

102. (A)

A body in circular motion has

- (a) varying velocity (b) tangential velocity (c) radial acceleration

103. (A)

Given $v = u + at$

$$0 = 15 - 0.9t$$

$$\Rightarrow t = \frac{15}{0.9} = 50 \text{ s}$$

$$\text{Now, } s = ut + \frac{1}{2}at^2$$

$$\Rightarrow s = 15 \times 50 - \frac{1}{2} \times 0.9 \times 2500$$

$$\Rightarrow s = 750 - 375 = 375 \text{ m}$$

$$\therefore \text{Distance from traffic light after 1 min.} = 400\text{m} - 375\text{m} = 25\text{m}$$

104. (D)

$$v_A = \text{slope} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$v_B = \text{slope} = \tan 60^\circ = \sqrt{3}$$

$$\therefore \frac{v_A}{v_B} = \frac{\frac{1}{\sqrt{3}}}{\sqrt{3}} = 1:3$$

105. (A)

$$\text{Velocity of approach} = v - (-v) = 2v$$

$$\text{Distance} = (1000 + 500) \text{ m} = 1500 \text{ m}$$

$$t = 10 \text{ s}$$

$$\therefore 2v = \frac{D}{t} = \frac{1500 \text{ m}}{10 \text{ s}} = 150 \text{ m/s}$$

$$\therefore v = 75 \text{ m/s}$$

106. (B)

$$-h = ut - \frac{1}{2}gt^2$$

$$\Rightarrow -h = 10 \times 11 - \frac{1}{2} \times 10 \times (11)^2$$

$$\Rightarrow -h = 110 - 605$$

$$\Rightarrow -h = -495 \text{ m}$$

$$\therefore h = 495 \text{ m.}$$

107. (B)

$$\text{Here } R = \frac{\rho l}{A} = \frac{1 \times 1}{0.25 \times 0.25} = 16 \Omega$$

$$\therefore I = \frac{V}{R} = \frac{16 \text{ V}}{16 \Omega} = 1 \text{ A}$$

108. (C)

$$\text{Given, } R_1 = 1 \Omega \text{ at } 300 \text{ K or } 27^\circ \text{C}$$

$$R_2 = 2 \Omega$$

$$\alpha = \frac{R_2 - R_1}{R_1 t_2 - R_2 t_1}$$

$$\Rightarrow 0.00125 = \frac{2 - 1}{1 \times t_2 - 2 \times 27}$$

$$\Rightarrow t_2 - 54 = \frac{1}{0.00125}$$

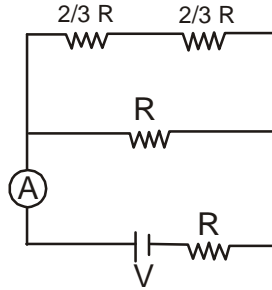
$$\Rightarrow t_2 = 854^\circ\text{C}$$

$$\therefore t_2 \text{ in kelvin} = (854 + 273)\text{K} = 1127 \text{ K.}$$

109. (C)

$$R_{AB} = \frac{2}{3}R; R_{BC} = \frac{2}{3}R$$

\(\therefore\) The circuit can be redrawn as



$$\text{Now, } R_{\text{eq}} = \left[\left(\frac{2}{3}R + \frac{2}{3}R \right) \parallel R \right] + R = \frac{11}{7}R$$

$$\text{Given, } R = 1 \Omega \therefore R_{\text{eq}} = \frac{11}{7} \Omega$$

$$V = I \cdot R = 7\text{A} \times \frac{11}{7} \Omega = 11 \text{ V}$$

110. (D)

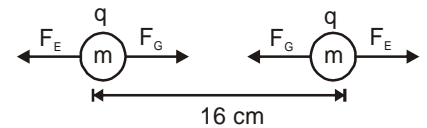
Since the particle do not experience any force hence.

$$F_G = F_E$$

$$\Rightarrow \frac{Gm \cdot m}{r^2} = \frac{Kq \cdot q}{r^2}$$

$$\Rightarrow Gm^2 = Kq^2$$

$$\text{or, } \left(\frac{q}{m} \right) = \sqrt{\frac{G}{K}} = \sqrt{4\pi\epsilon_0 G}$$



111. (A)

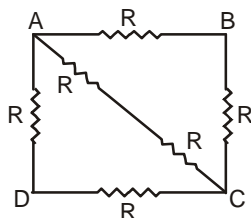
$$I = \frac{ne}{t}$$

$$\therefore n = \frac{I \times t}{e} = \frac{16 \times 10^{-3} \times 1}{1.6 \times 10^{-19}} = 10 \times 10^{-3} \times 10^{19}$$

$$\therefore n = 10^{17}$$

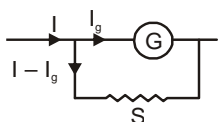
112. (A)

The network forms a balanced wheat stone bridge along AC hence the circuit can be redrawn as.



$$\therefore R_{AC} = \frac{2R}{3}$$

113. (C)



$$S = \frac{I_g \cdot G}{I - I_g}$$

Hence, the value of shunt resistance must be low.

CHEMISTRY

114. (B)

As the temperature is raised gradually above 273 K, more and more water molecules start coming closer resulting in decrease in volume and hence increase in density. Water is the only substance where the maximum density does not occur when solidified. As ice is lighter than water, it floats. But at approximately 4°C (277K), pure water reaches its maximum density. As it is cooled further, it expands to become less dense. Hence, density of water is maximum at 277 K.

115. (B)

298 K or 25°C and 1 atm pressure are taken as standard temperature and pressure called STP.

116. (C)

Only in gases the particles follow a zig-zag path.

117. (B)

10 g of water at 0°C has more heat content since the water particles have more energy as compared to particles in ice and during the change of state from ice to water heat energy equal to latent heat of fusion is absorbed.

118. (B)

Ammonia can be liquefied at high pressure and low temperature.

119. (A)

The zig-zag motion of colloidal particles is called Brownian movement.

120. (A)

Starch solution will show Tyndall effect i.e., scattering of light since it is a colloidal solution.

121. (C)

In case of smoke solid particles are dispersed in gas.

122. (C)

Smoke is aerosol, solid dispersed in gas.

123. (A)

6.022×10^{23} molecule has mass = 18 g

$$\begin{aligned} 1 \text{ molecule has mass} &= \frac{18}{6.022 \times 10^{23}} \\ &= 3 \times 10^{-23} \text{ g} \\ &= 3 \times 10^{-26} \text{ Kg} \end{aligned}$$

124. (B)

44 g CO_2 occupies 22.4 L at STP

4.4 g CO_2 occupies $\frac{22.4}{44} \times 4.4 = 2.24 \text{ L}$.

125. (D)

Number of particles in 8 g of CH_4

$$= \frac{6.022 \times 10^{23}}{16} \times 8 = 3.0115 \times 10^{23}$$

No. of particles in 4.4 g of CO_2

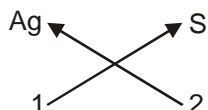
$$= \frac{6.022 \times 10^{23}}{44} \times 4.4 = 0.6022 \times 10^{23}$$

No. of particles in 34.2 g of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$

$$= \frac{6.022 \times 10^{23}}{342} \times 34.2 = 0.6022 \times 10^{23}$$

$$\begin{aligned} \text{No. of particles in 2 g of } \text{H}_2 &= \frac{6.022 \times 10^{23}}{2} \times 2 \\ &= 6.022 \times 10^{23} \end{aligned}$$

126. (A)



BIOLOGY

127. (B)

Calcium pectate acts as a cementing material.

128. (A)

Vacuole perform the functioning of storing various components including waste products.

129. (D)

Haemoglobin is an iron containing Respiratory pigment.

130. (C)

Retinol is a type of vitamin A.

131. (C)

Water & chlorophyll.

132. (C)

38 ATP

133. (B)

Systolic pressure = 120 mmHg & Diastolic pressure = 80 mmHg.

134. (B)

Transpirational pull.

135. (B)

Oxidation.

136. (B)

137. (B)

Human heart perform double circulation.

138. (B)

Carbon Mono-oxide.

139. (A)

140. (D)

MATHEMATICS

141. (A)

$$x + 1 = 0$$

$$x = -1$$

$$R_1 = -2$$

$$R_2 = 2$$

$$\therefore R_1 + R_2 = 0$$

142. (D)

$$5^{2x} - 7^x - 5^{2x}(35) + 7^x(35) = 0$$

\Rightarrow By option

$$5^0 - 7^0 - 5^0(35) + 7^0(35)$$

$$\Rightarrow 1 - 1 - 35 + 35 = 0$$

143. (A)

$$\sqrt{\left(\frac{4}{7}\right)^{x+4}} = \frac{7}{4}$$

$$\Rightarrow \left(\frac{4}{7}\right)^{\frac{x+4}{2}} = \left(\frac{4}{7}\right)^{-1}$$

$$\frac{x+4}{2} = -1$$

$$\boxed{x = -6}$$

144. (A)

$$a^x = c^q = b \quad \dots(i)$$

$$a^y = a^z = d \quad \dots(ii)$$

$$\text{From (i) } a = c^{q/x}$$

$$\text{From (ii) } a = c^{y/z}$$

$$\therefore c^{q/x} = c^{y/z}$$

$$\Rightarrow xy = qz \text{ Ans}$$

145. (C)

$$a^2bc^3 = 5^3 \quad \dots(i)$$

$$ab^2 = 5^6 \quad \dots(ii)$$

Multiplying (i) and (ii) we get

$$(abc)^3 = 5^9$$

$$\therefore abc = 5^3 \text{ Ans}$$

146. (D)

Clearly $x=2$ from option satisfy the equation

$$3^x + 4^x = 25$$

147. (D)

$$\frac{37}{13} = 2 + \frac{1}{x + \frac{1}{y + \frac{1}{z}}}$$

$$\frac{37}{13} - 2 = \frac{1}{x + \frac{1}{y + \frac{1}{z}}}$$

$$\frac{11}{13} = \frac{1}{x + \frac{1}{y + \frac{1}{z}}}$$

$$\frac{1}{13} = \frac{1}{1 + \frac{2}{11}} = \frac{1}{1 + \frac{1}{5 + \frac{1}{2}}}$$

$$\frac{1}{1 + \frac{1}{5 + \frac{1}{2}}} = \frac{1}{x + \frac{1}{y + \frac{1}{z}}}$$

$$x = 1, y = 5, z = 2$$

$$\boxed{x + y + z = 8}$$

148. (D)

$$(2012 \times 2013 \times 2014) \div (2011)$$

$$\Rightarrow (2011+1)(2011+2)(2011+3)$$

$$\Rightarrow 2011^3 + 6 \times 2011^2 + 11 \times 2011 + 6$$

\(\therefore\) Remainder is 6

149. (D)

$$(41)^{\frac{1}{5}} = \text{lies between 2 and 3}$$

$$\text{because } 2^5 = 32$$

150. (D)

$$\sqrt{338} - \sqrt{288} = m$$

$$13\sqrt{2} - 12\sqrt{2}$$

$$\Rightarrow \sqrt{2}(13-12) = \sqrt{2}$$

151. (C)

$$f(x) = x^3 + x^2 + x + 1$$

$$\Rightarrow x^2(x+1) + 1(x+1) = (x^2+1)(x+1)$$

$$\begin{aligned} g(x) &= x^3 - x^2 + x - 1 = x^2(x-1) + 1(x-1) \\ &= (x^2+1)(x-1) \end{aligned}$$

152. (C)

$$\text{Let } f(x) = x^3 - x^2 + x - 1$$

$$= x^2(x-1) + 1(x-1) = (x^2+1)(x-1)$$

$$g(x) = x^3 - 2x^2 + x - 2$$

$$= x^2(x-2) + 1(x-2)$$

$$= (x^2+1)(x-2)$$

$$\text{L.C.M} = (x^2+1)(x-1)(x-2)$$

153. (D)

$$ab = a^b$$

$$b = \frac{a^b}{a} = a^{b-1}$$

$$\frac{a}{b} = a^{3b}$$

$$\Rightarrow \frac{a}{a^{b-1}} = a^{3b}$$

$$\Rightarrow a^{1-b+1} = a^{3b}$$

$$\Rightarrow a^{2-b} = a^{3b}$$

$$2 - b = 3b$$

$$2 = 4b$$

$$\boxed{b = \frac{1}{2}}$$

$$\frac{1}{2} = a^{-\frac{1}{2}}$$

$$\frac{1}{4} = a^{-1}$$

$$\boxed{a = 4}$$

154. (D)

$x^n + a^n$ is always divisible by $(x + a)$

$$(2^3)^{35} + (3^3)^{35} \longrightarrow \text{divisible by } 35$$

$$(2^5)^{21} + (3^5)^{21} \longrightarrow 32 + 243 \text{ divisible by } 275$$

but not divisible by 13

155. (D)

$$f(x) = x^6 - 10x^5 - 10x^4 - 10x^3 - 10x^2 - 10x$$

$$f(-1) = (-1)^6 - 10(-1)^5 - 10(-1)^4 - 10(-1)^3 - 10(-1)^2 - 10(-1) + 10$$

$$= 1 + 10 - 10 + 10 - 10 + 10 + 10 = 21$$

156. (B)

$$a = \sqrt{11} + \sqrt{3} \Rightarrow a^2 = 14 + 2\sqrt{33}$$

$$b = \sqrt{12} + \sqrt{2} \Rightarrow b^2 = 14 + 2\sqrt{24}$$

$$c = \sqrt{6} + \sqrt{4} \Rightarrow c^2 = 10 + 2\sqrt{24}$$

$$a > b > c$$

157. (A)

$$\frac{1}{\sqrt{10} + \sqrt{9}} + \frac{1}{\sqrt{11} + \sqrt{10}} + \frac{1}{\sqrt{12} + \sqrt{11}} + \dots + 91 \text{ times}$$

$$\Rightarrow \frac{\sqrt{10} - \sqrt{9}}{1} + \sqrt{11} - \sqrt{10} + \sqrt{12} - \sqrt{11} + \dots + 91 \text{ terms}$$

$$\Rightarrow -\sqrt{9} + \sqrt{100} = -3 + 10 = 7$$

158. (D)

5	N	
7	x	3
9	y	4
	z	7

$$y = 9 \times 1 + 7 = 16$$

$$x = 16 \times 7 + 4 = 116$$

$$N = 116 \times 5 + 3 = 583$$

When N is divided by 35 remainder will be 23

159. (A)

$$\begin{aligned}
 & (41^{16} - 14^{16}) \\
 &= (41^8 + 14^8)(41^4 + 14^4)(41^2 + 14^2)(41+14)(41-14) \\
 &= (41^8 + 14^8)(41^4 + 14^4)(41^2 + 14^2) \cdot 55 \times 27 \\
 &= (41^8 + 14^8)(41^4 + 14^4)(41^2 + 14^2) \times 1485 \\
 &\therefore \text{correct option is (A) 1485}
 \end{aligned}$$

160. (A)

$$(x+1)(x+2)(x+3) = x^3 + 6x^2 + (ax+b)$$

$$\Rightarrow x^3 + 6x^2 + 11x + 6 = x^3 + 6x^2 + ax + b$$

comparing we get

$$a = 11$$

- | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|
| 161. (A) | 162. (A) | 163. (C) | 164. (A) | 165. (B) | 166. (B) | 167. (A) |
| 168. (C) | 169. (A) | 170. (C) | 171. (A) | 172. (B) | 173. (B) | 174. (A) |
| 175. (B) | 176. (D) | 177. (B) | 178. (A) | 179. (B) | 180. (B) | 181. (C) |
| 182. (B) | 183. (A) | 184. (D) | 185. (D) | 186. (A) | 187. (A) | 188. (D) |
| 189. (A) | 190. (B) | 191. (C) | 192. (B) | 193. (C) | 194. (D) | 195. (B) |
| 196. (D) | 197. (B) | 198. (D) | 199. (C) | 200. (D) | | |