

SOLUTIONS

NTSE TEST

STAGE-I

PART TEST-4

Test Date: 22-09-17



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Call : 0612-3223681/2 | 7544015993/6/7 | 7070999604/5

MENTAL ABILITY

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

ENGLISH

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

SCHOLASTIC APTITUDE TEST

101. (B)

Frequency = No. of compression/rarefaction formed per unit time

$$n = \frac{60}{0.6} = 100 \text{ Hz}$$

102. (A)

$$\lambda = 2m ; v = f\lambda$$

$$v = 2 \times 180 = 360 \text{ m/s}$$

103. (A)

By Archimedes principle

$$F = \rho_A \frac{V}{2}g + \rho_B \frac{V}{2}g$$

104. (B)

$$\frac{\rho_b}{\rho_w} = \frac{2}{3}$$

105. (B)

Given $T_1 = 1 \text{ yr}$, $R_1 = R$, $R_2 = 2R$

According to Kepler's third law of planetary motion,

$$T^2 \propto R^3$$

where, R is the distance between earth and sun.

$$\therefore \left(\frac{T_1}{T_2}\right)^2 = \left(\frac{R_1}{R_2}\right)^3 = \left(\frac{R}{2R}\right)^3 = \frac{1}{8}$$

$$\Rightarrow \frac{T_1}{T_2} = \frac{1}{2\sqrt{2}}$$

$$\Rightarrow T_2 = 2\sqrt{2} T_1 = 2\sqrt{2} \text{ yr}$$

106. (A)

The acceleration due to gravity on the new planet can be found using the relation.

$$g = \frac{GM}{R^2} \quad \dots(1)$$

but

$$M = \frac{4}{3}\pi R^3 \rho, \rho \text{ being density.}$$

Thus, E.q. (i) becomes $g = \frac{G \times \frac{4}{3}\pi R^3 \rho}{R^2} = G \times \frac{4}{3}\pi R \rho$

$$\Rightarrow g \propto R$$

$$\therefore \frac{g'}{g} = \frac{R'}{R}$$

$$\Rightarrow \frac{g'}{g} = \frac{3R}{R} = 3$$

$$g' = 3g$$

107. (C)

At depth d from earth's surface.

$$g' = g\left(1 - \frac{d}{R}\right)$$

Given, $g' = \frac{g}{n}$

So, $\frac{g}{n} = g\left(1 - \frac{d}{R}\right)$ or $\frac{1}{n} = 1 - \frac{d}{R}$

or, $\frac{d}{R} = 1 - \frac{1}{n} = \frac{(n-1)}{n} \Rightarrow d = \frac{(n-1)R}{n}$

108. (C)

$$m = 1 + \frac{D}{f_e}, \Rightarrow 10 = 1 + \frac{25}{f_e}$$

$$f_e = \frac{25}{9} \text{ cm} = 25 \text{ mm}$$

109. (B)

Conceptual

110. (B)

$$\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{40} + \frac{1}{-25} = \frac{5-8}{200} = -\frac{3}{200}$$

$$P = \frac{100}{F(\text{cm})} D = \frac{100}{-200/3} = -1.5 D$$

111. (A)

$$\frac{1}{-(N.P.)} - \frac{1}{-(\text{distance of object})} = \frac{1}{f}$$

$$\frac{1}{-1.0} - \frac{1}{-0.2} = -1 + 5 = \frac{1}{f} \Rightarrow \frac{1}{f} = P = 4D$$

112. (A)

$$\frac{1}{-50} - \frac{1}{-(25)} = \frac{1}{f}$$

$$\frac{1}{f} = \frac{1}{50} \Rightarrow \frac{100}{f(\text{cm})} = \frac{100}{50} = 2D$$

$$\frac{1}{-150} - \frac{1}{\infty} = \frac{1}{f'}$$

$$f' = -150 \text{ cm} \Rightarrow P = \frac{100}{-150} = -\frac{2}{3}D$$

113. (C)

Conceptual.

114. (B)

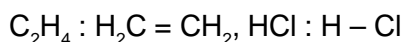
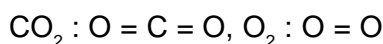
Fullerene is fused ring system of hexagons and pentagons.

115. (B)

116. (D)

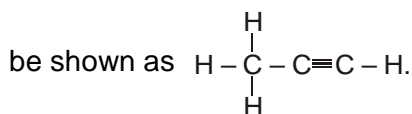
Urea was the first synthetic organic compound.

117. (C)

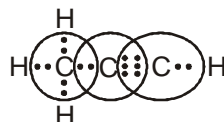


118. (B)

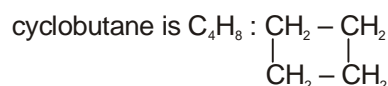
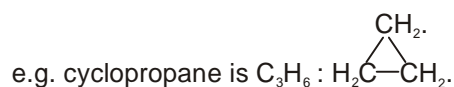
C_3H_4 or propyne has a triple bond. It belongs to the homologous series of alkynes with general formula $\text{C}_n\text{H}_{2n-2}$. Its structure can



The electronic dot structure can be shown as



119. (D)



120. (C)

RCOOR represents an ester where both R or alkyl group can be same or different. One alkyl group is from carboxylic acid while other R is from alcohol.

e.g. $\text{CH}_3\text{COOCH}_3$ (Methyl ethanoate),
 $\text{CH}_3\text{COOC}_2\text{H}_5$ (Ethyl ethanoate), etc.

121. (B)

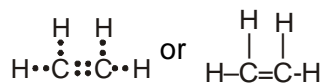
122. (C)

Formation of N_2 involved triple covalent bond. Electronic configuration of N = 2, 5



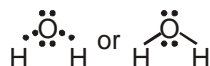
123. (B)

Ethene contains a double covalent bond formed by sharing two pairs of electrons.



124. (C)

Water molecule is formed by sharing electrons between hydrogen and oxygen atoms leaving two pairs of unpaired electrons.



125. (D)

Coke is an amorphous form of carbon.

126. (D)

127. (C)

Anther produce pollen grain, while ovary produce female gamete ova.

128. (C)

129. (B)

130. (C)

Clone formation doesn't takes place in sexual reproduction.

131. (D)

132. (D)

133. (C)

Sneezing droplet may spread pathogen of certain disease.

134. (C)

135. (A)

136. (D)

137. (B)

Only bisexual flower possess both stamen and pistil.

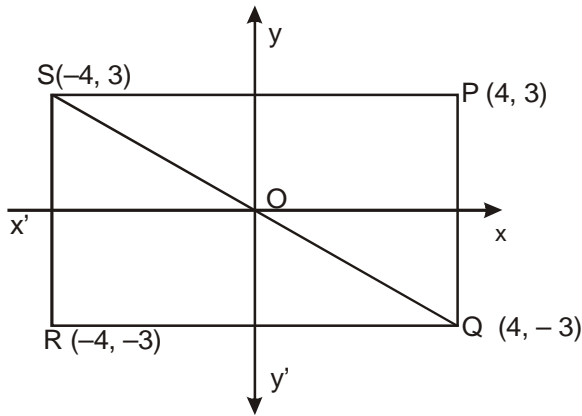
138. (A)

Pollen grain formed due to meiosis in pollen mother cell, which itself a diploid structure.

139. (C)

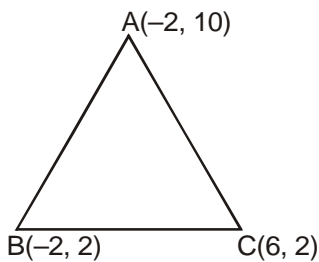
140. (A)

141. (B)



$$\text{half of Diagonal} = \frac{1}{2}\sqrt{64 + 36} = \frac{1}{2} \times 10 = 5$$

142. (B)



$$AB = \sqrt{(-2+2)^2 + (10-2)^2} = 8$$

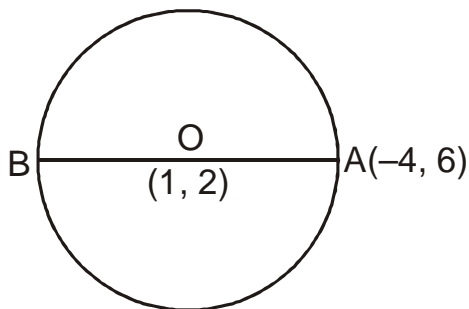
$$AC = \sqrt{64 + 64} = \sqrt{128} = 8\sqrt{2}$$

$$BC = \sqrt{(-2-6)^2 + (2-2)^2} = 8$$

$$AB = BC$$

$$\text{and } AB^2 + BC^2 = AC^2$$

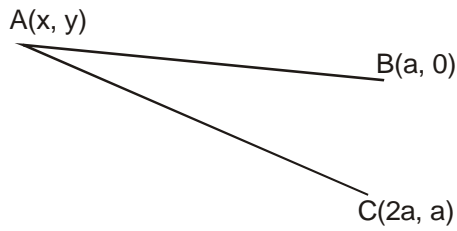
143. (D)



$$OA = \sqrt{25 + 16} = \sqrt{41}$$

$$AB = 2\sqrt{41}$$

144. (B)



$$(x-a)^2 + y^2 = (x-2a)^2 + (y-a)^2$$

$$\Rightarrow (x-a)^2 + (x-2a)^2 = (y-a)^2 - y^2$$

$$\Rightarrow (x-a+x-2a)(x-a-x+2a) = (y-a-y)(y-a+y)$$

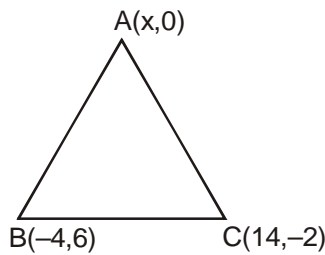
$$(2x-3a)(a) = (-a)(2y-a)$$

$$2x-3a = -2y+a$$

$$2x+2y = 4a$$

$x+y = 2a$

145. (A)



$$AB = \sqrt{(x+4)^2 + 36}$$

$$AC = \sqrt{(x-14)^2 + 4}$$

$$AB = AC$$

$$(x+4)^2 + 36 = (x-14)^2 + 4$$

$$(x+4)^2 - (x-14)^2 = -32$$

$$(x+4+x-14)(x+4-x+14) = -32$$

$$(2x-10)(18) = -32$$

$$2x-10 = \frac{-32}{18}$$

$$2x = \frac{-16}{9} + 10 = \frac{-16+90}{9} = \frac{74}{9}$$

$$x = \frac{37}{9}$$

146. (B)

$$100 \text{ — } 360$$

$$1 \text{ — } \frac{360}{100}$$

$$45 \text{ — } \frac{360 \times 45}{100} = 162$$

$$55 \text{ — } \frac{360 \times 55}{100} = 198$$

147. (A)

$$21 + 30 + 16 + x + 9 = 90$$

$$x = 90 - 76 = 14$$

$$\boxed{x = 14}$$

23, 30, 31, 42, 42 + y, 60, 67 and 69

$$\frac{42 + 42 + y}{2} = 47.5$$

$$84 + y = 95.0$$

$$y = 95 - 84 = 11$$

148. (B)

$$7 + 20 + 7x - 5 = 60$$

$$37 - 5 + 7x = 60$$

$$7x = 60 - 32 = 28$$

$$\boxed{x = 4}$$

8, 9, 8, 15, 20

8, 8, 9, 15, 20

Median is 9

149. (B)

$$\frac{5x + 45 + 8x - 24}{2} = 186$$

$$13x + 21 = 372$$

$$13x = 372 - 21 = 351$$

$$x = \frac{351}{13} = 27$$

150. (B)

$$\frac{a + 4 + a + 10}{2} = 22$$

$$\frac{2a + 14}{2} = 22$$

$$a + 7 = 22$$

$$\boxed{a = 15}$$

151. (C)

Conceptual.

152. (B)

$S = (H H H) (H H T) (H T H) (T H H) (T T T) (T T H) (T H T) (H T T)$

$n(S) = 8$

$P(E) = \text{Probability of all identical out comes} = \frac{2}{8}$

$$P(E) = 1 - \frac{2}{8} = \frac{6}{8} = \frac{3}{4}$$

153. (A)

$$P(E) = \frac{{}^3C_1 \times {}^4C_1 \times {}^5C_1}{{}^{12}C_3} = \frac{3 \times 4 \times 5}{\frac{12 \times 11 \times 10}{3 \times 2}} = \frac{3 \times 4 \times 5 \times 2 \times 3}{10 \times 11 \times 12} = \frac{3}{11}$$

154. (C)

$$\frac{{}^{15}C_1 \times {}^{15}C_1}{{}^{30}C_2} = \frac{15}{29}$$

155. (C)

Conceptual.

156. (D)

$$P(E) = \frac{{}^5C_2 \times {}^4C_1}{{}^9C_2} = \frac{\frac{5 \times 4}{2} \times 4}{\frac{9 \times 8}{2}} = \frac{5 \times 4 \times 4}{2 \times 9 \times 8} \times 2 = \frac{10}{9}$$

157. (D)

11 21 31 41 (51) 61
 12 22 32 (42) 52 62
 13 23 (33) 43 53 63
 14 (24) 34 44 54 64
 (15) 25 35 45 55 65
 16 26 36 46 56 66

$n(s) = 36$ $P(E) = \frac{5}{36}$

158. (D)

su Ar = $4\pi r^2$

New radius = $3r$

Surface area = $4\pi(3r)^2 = 36\pi r^2$

increase in the SA = $36\pi r^2 - 4\pi r^2 = 32\pi r^2$

The % of increase in the S. A

$$= \frac{\text{increase in the S.A}}{\text{S.A}} \times 100$$

$$= \frac{32\pi r^2}{4\pi r^2} \times 100 = 800$$

159. (B)

$$\frac{r_1}{r_2} = \frac{4}{5}, \quad \frac{h_1}{h_2} = \frac{5}{6}$$

$$\frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{16}{25} \times \frac{5}{6} = \frac{8}{15}$$

160. (A)

volume of the cone = $33.264 \times 1000 = 33264 \text{ cm}^3$

$$\frac{1}{3} \times \pi r^2 h = 33264$$

height = 72 cm

$$r^2 = 33264 \times 3 \times \frac{7}{22} \times \frac{1}{72} = 441$$

$$r = \sqrt{441}$$

$$s^2 = r^2 + h^2 = (21)^2 + (72)^2 = 441 + 5184 = 5625$$

$$s = \sqrt{5625} = 75 \text{ cm}$$

$$\text{Curved S. A} = \pi r s = \frac{22}{7} \times 21 \times 75 = 4950 \text{ cm}^2$$

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

NTSE PART TEST-4 [STAGE-1] _22-09-2017-2018

ANSWER KEY

MENTAL ABILITY

- | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|
| 1. (B) | 2. (A) | 3. (C) | 4. (B) | 5. (C) | 6. (D) | 7. (D) |
| 8. (C) | 9. (C) | 10. (A) | 11. (A) | 12. (A) | 13. (D) | 14. (B) |
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| 50. (D) | | | | | | |

ENGLISH

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| 79. (D) | 80. (A) | 81. (A) | 82. (B) | 83. (C) | 84. (B) | 85. (D) |
| 86. (A) | 87. (B) | 88. (B) | 89. (A) | 90. (D) | 91. (C) | 92. (D) |
| 93. (B) | 94. (B) | 94. (B) | 96. (C) | 97. (A) | 98. (B) | 99. (D) |
| 100. (D) | | | | | | |

SCHOLASTIC APTITUDE TEST

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|----------|----------|----------|----------|----------|----------|----------|
| 101. (B) | 102. (A) | 103. (A) | 104. (B) | 105. (B) | 106. (A) | 107. (C) |
| 108. (C) | 109. (B) | 110. (B) | 111. (A) | 112. (A) | 113. (C) | 114. (B) |
| 115. (B) | 116. (D) | 117. (C) | 118. (B) | 119. (D) | 120. (C) | 121. (B) |
| 122. (C) | 123. (B) | 124. (C) | 125. (D) | 126. (D) | 127. (C) | 128. (C) |
| 129. (B) | 130. (C) | 131. (D) | 132. (D) | 133. (C) | 134. (C) | 135. (A) |
| 136. (D) | 137. (B) | 138. (A) | 139. (C) | 140. (A) | 141. (B) | 142. (B) |
| 143. (D) | 144. (B) | 145. (A) | 146. (B) | 147. (A) | 148. (B) | 149. (B) |
| 150. (B) | 151. (C) | 152. (B) | 153. (A) | 154. (C) | 155. (C) | 156. (D) |
| 157. (D) | 158. (D) | 159. (B) | 160. (A) | 161. (B) | 162. (C) | 163. (C) |
| 164. (A) | 165. (B) | 166. (D) | 167. (A) | 168. (A) | 169. (B) | 170. (C) |
| 171. (B) | 172. (A) | 173. (C) | 174. (B) | 175. (C) | 176. (C) | 177. (B) |
| 178. (D) | 179. (C) | 180. (A) | 181. (D) | 182. (D) | 183. (A) | 184. (C) |
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| 199. (D) | 200. (C) | | | | | |