

# SOLUTIONS

## NTSE TEST

### STAGE-I

### PART TEST-II

Test Date: 01-09-17



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## MENTAL ABILITY

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

## ENGLISH

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

## SCHOLASTIC APTITUDE TEST

101. (B)

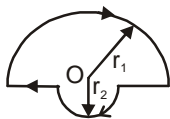
Use right hand curl rule.

102. (B)

Conceptual.

103. (C)

Magnetic field at O due to straight wires is zero.



$$\text{and } B_1 = \frac{\mu_0 i}{4r_1}, \otimes \quad B_2 = \frac{\mu_0 i}{4r_2}, \otimes$$

$$B_0 = B_1 + B_2 = \frac{\mu_0 i}{4} \left( \frac{1}{r_1} + \frac{1}{r_2} \right), \otimes$$

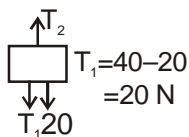
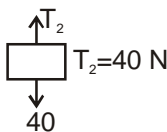
104. (D)

$$KE = \frac{1}{2}mv^2$$

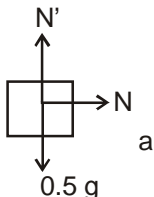
$$v = \sqrt{\frac{2KE}{m}} = \sqrt{\frac{2 \times 10^6 \times 1.6 \times 10^{-19}}{1.67 \times 10^{-27}}} = 2 \times 10^7$$

Now,  $F = BqV = 2.5 \times 1.6 \times 10^{-19} \times 2 \times 10^7 = 8 \times 10^{-12} \text{ N}$

105. (D)



106. (D)



$$6 = 0.5 a$$

$$a = 12 \text{ m/s}^2$$

107. (C)

Direction of current changes every half revolution.

108. (D)

Conceptual.

109. (D)

$$T_{1/2} = \frac{0.693}{\lambda}$$

$$T_{1/2} = \frac{0.693}{4.28 \times 10^{-4}} = 1619.15 \text{ yrs} = 1620 \text{ yr}$$

110. (B)

Conceptual

111. (B)

Force is  $F = \frac{\text{change of momentum}}{\text{time}} = \frac{\text{impulse}}{\text{time}}$

the change of momentum of the bullet is

$$\text{impulse} = V_m - (-V) m = 2 Vm = 2 V \times 0.005 \text{ kgm/s}$$

and assuming that the time of impact of 1 bullet is 0.01s, then the force is

$$F = (2 v \times 0.005 / 0.001) \text{ N}$$

now net weight = Force of find v:

$$0.01 \text{ kg} \times 9.81 \text{ m/s}^2 = (2 \times 0.0005 \text{ kg} / 0.01 \text{ s}) V \Rightarrow \boxed{v = 0.098 \text{ m/s}}$$

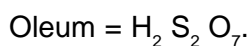
112. (C)

$$T = \frac{mv^2}{r} = \frac{m(R\omega)^2}{R} = m\omega^2 R = 100 \times 10^{-3} \times \left(2\pi \times \frac{200}{60}\right)^2 \times 2$$

$$= 0.1 \times 4\pi^2 \times \frac{400}{36} \times 2 = 89.42 \text{ N}$$

113. (C)

114. (C)



115. (A)

Acidic solvents are those who donate proton.

116. (D)

Formula of perchloric acid =  $\text{HClO}_4$

$$\text{O. S of Cl} = 1 + x + -8 = 0$$

$$x = +7$$

117. (A)

Oxidation state of phosphorous vary from

(+ valence shell  $e^-$ ) to (valence shell  $e^- - 8$ )

$$= +5 \text{ to } -3$$

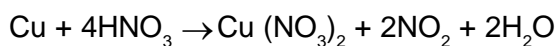
118. (B)

$$\text{H}_3\text{PO}_3 = 3 + x - 6 = 0$$

$$x = +3$$

119. (C)

For balanced chemical equation.



So, the correct answer is  $x = 4$  &  $y = 2$ .

120. (A)

In a neutralization reaction, acids & bases combine to form stable salts which is comprised by liberation of energy.

121. (D)

Statement A is according to Law of conservation of mass. Statement B & C are also true regarding chemical & physical changes.

122. (D)

All the three statements are correct regarding the chemical reaction.

123. (B)

Acetic acid is always used for making vinegar in small concentrations.

124. (C)

$\text{H}_2\text{SO}_4$  combines with  $\text{CuO}$  to form copper sulphate.

125. (B)

$\text{NH}_4\text{OH}$  has the lowest pH value among all bases.

126. (B)

Refer reactivity series.

127. (A)

128. (B)

129. (C)

130. (C)

The sensory nerves from the receptors brings the signal to spinal cord and motor nerves takes the message from spinal cord to the respective muscles.

131. (B)

Acetylcholine is a neurotransmitter involved in stimulatory neuro-transmission.

132. (A)

133. (C)

At axonal end chemical signal forms as a result of the involvement of neurotransmitters at synapse.

134. (A)

Average weight of an adult human brain is 1350 g (in the range 1250 to 1400g)

135. (D)

136. (D)

137. (B)

138. (B)

Tendons are example of dense regular connective tissue which connects bone to muscles.

139. (A)

Spongy parenchyma are also called as spongy mesophyll and has many spaces in between the cells its main function is storage of food.

140. (A)

141. (A)

$AD = AE$  (I)

$\alpha + 2\beta = 180$  (II)

By ASA criteria

$\triangle ABD \cong \triangle ACE$

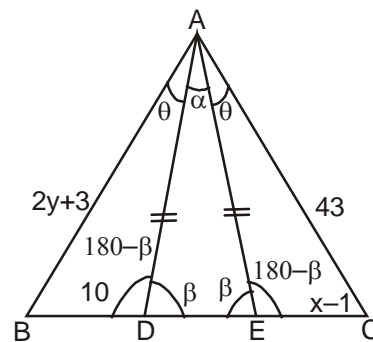
$$\frac{AB}{AC} = \frac{BD}{CE} = \frac{AD}{AE}$$

$$\frac{2y + 3}{43} = \frac{10}{x - 1} = \frac{1}{1}$$

$\Rightarrow x - 1 = 10 \Rightarrow \boxed{x = 11}$

$2y + 3 = 43 \Rightarrow 2y = 40 \Rightarrow \boxed{y = 20}$

$\therefore$  Option (A) is correct



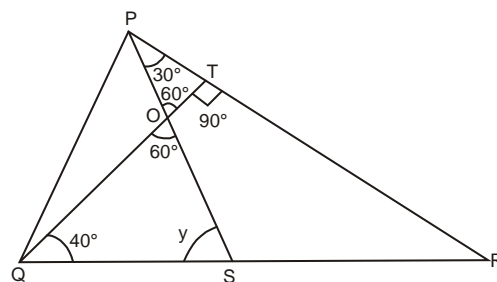
142. (D)

In  $\triangle OQS$

$$40 + 60 + y = 180$$

$$y = 80^\circ$$

$\therefore$  Option (D) is correct



143. (B)

$$4^x - \frac{4^x}{4} = 24 \quad \text{Let } 4x = y$$

$$\Rightarrow y - \frac{y}{4} = 24 \quad \Rightarrow \frac{3y}{4} = 24$$

$$\Rightarrow y = \frac{24 \times 4}{3} = 32 \quad \therefore 4^x = 32$$

$$\therefore 2^x = 2^5 \quad 2x = 5 \quad \Rightarrow x = \frac{5}{2}$$

$$(2x)^2 = (5)^{5/4} = \sqrt[4]{5^5} = 25\sqrt{5}$$

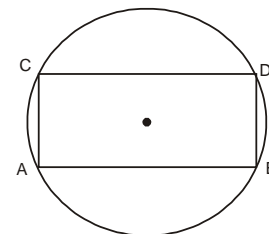
144. (B)

$$2\pi r = 220$$

$$r = \frac{220}{2\pi} = \frac{220}{2} \times \frac{7}{22} = 35 \text{ cm}$$

$$d = 2r = 70$$

$$\text{Area of square of ABCD} = \frac{1}{2} d^2 = \frac{1}{2} \times 70 \times 70 = 2450 \text{ cm}^2$$



145. (C)

Area rectangle  $\square$  ABC

$$A_1 = \ell \times b$$

If dimension increase 100 %

$$\therefore AB = 2\ell \quad BC = rb$$

$$A_2 = \text{Area of } \square ABC = 4\ell b$$

$$\% \text{ change} = \frac{A_2 - A_1}{A_1} \times 100 = \frac{4\ell b - \ell b}{\ell b} \times 100 = 300\%$$

146. (C)

$$\frac{PA^2}{Pp^2} = \frac{1}{2} \Rightarrow \frac{PA}{PQ} = \frac{1}{\sqrt{2}} - 1 \Rightarrow \frac{PA - PQ}{PQ} = \frac{1 - \sqrt{2}}{\sqrt{2}} - \frac{AQ}{PQ} = \frac{1 - \sqrt{2}}{\sqrt{2}} = \frac{AQ}{PQ} = \frac{\sqrt{2} - 1}{\sqrt{2}}$$

147. (C)

Given  $AB \times AC = 409.6$

$BE \times CF = 202.5$

Now

$$\text{Area of } \triangle ABC = \frac{1}{2} \times AD \times BC = \frac{1}{2} \times AC \times BE = \frac{1}{2} \times AB \times CF$$

(i)                      (ii)                      (iii)

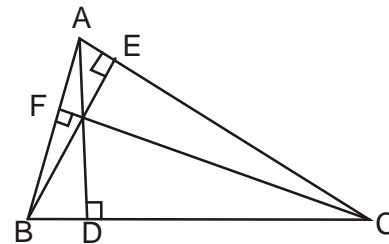
operating (ii)  $\times$  (iii) we get

$$(\text{Area of } \triangle ABC)^2 = \frac{1}{4} (AB \times AC \times BE \times CF)$$

$$\Rightarrow \text{Area of } \triangle ABC = \sqrt{\frac{1}{4} \times 409.6 \times 202.5}$$

$$\Rightarrow \frac{1}{2} \times AD \times BC = \frac{1}{2} \times \frac{64 \times 45}{10}$$

$$\Rightarrow AD \times BC = \frac{64 \times 45}{10} = 288 \text{ Ans.}$$



148. (C)

$$AB = BC = CA \text{ (Given)} \tag{i}$$

$$BD = CD = \frac{1}{2} BC \tag{ii}$$

$$\text{In } \triangle ABD, AB^2 = AD^2 + BD^2 \tag{iii}$$

$$\text{In } \triangle ACD, AC^2 = AD^2 + CD^2 \tag{iv}$$

(II) + (IV)

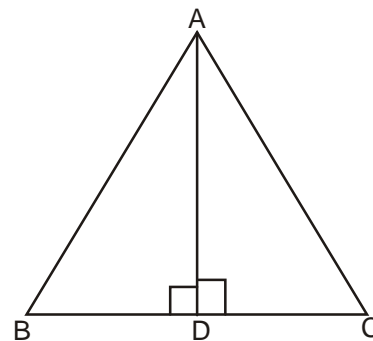
$$AB^2 + AC^2 = 2AD^2 + BD^2 + CD^2$$

$$2AB^2 = 2AD^2 + \left(\frac{1}{2}BC\right)^2 + \left(\frac{1}{2}BC\right)^2$$

$$2AB^2 = 2AD^2 + \frac{BC^2}{2} \text{ or } 2AB^2 = 2AD^2 + \frac{AB^2}{2}$$

$$\Rightarrow \frac{3AB^2}{2} = 2AD^2 \Rightarrow 3AB^2 = 4AD^2$$

$\therefore$  Option (C) is correct



149. (A)

150. (A)

$$\frac{3x-2}{7x-5} = \frac{5x-4}{5x-3}$$

$$\Rightarrow 20x^2 - 34x + 14 = 0$$

$$\Rightarrow 10x^2 - 17x + 7 = 0$$

$$\Rightarrow x = 1, \frac{7}{10}$$

$$AE = 5 \times \frac{7}{10} - 4 = 3.5 - 4 = -0.5 < 0 \text{ (Not possible)}$$

\(\therefore\) only  $x = 1$  satisfy.

151. (D)

Given: diameter( $d$ ) = 40 cm

$$\Rightarrow \text{Radius}(R) = 40/2 = 20 \text{ cm}$$

$$\text{Distance covered in 1 revolution} = 2\pi R = \left(2 \times \frac{22}{7} \times 20\right) \text{cm} = \frac{880}{7} \text{cm}$$

For 1 revolution —————  $\frac{880}{7}$  cm      ? ————— 176 m or 17600 cm

$$\text{Required number of revolutions} = \left(17600 \times \frac{7}{880}\right) = 140$$

152. (B)

$$x^2 + p^2 = Q^2 + x^2 - 2Qx$$

$$2Qx = Q^2 - p^2$$

$$x = \frac{Q^2 - p^2}{2Q}$$

153. (D)

$$2x^2 + xy - 3y^2 + x + ay - 10 = (2x + 3y + b)(x - y - 2)$$

$$\Rightarrow 2x^2 + xy - 3y^2 + x + ay - 10 = 2x^2 - 2xy - 4x + 3xy - 3y^2 - 6y + bx - by - 2b$$

$$\Rightarrow 2x^2 + xy - 3y^2 + x + ay - 10 = 2x^2 + xy - 3y^2 + x(b - 4) + y(-6 - b) - 2b$$

$$\Rightarrow b - 4 = 1 \Rightarrow b = 5$$

$$-6 - b = a$$

$$-6 - 5 = a \Rightarrow -11$$



154. (A)

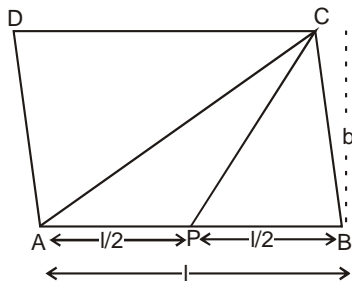
Area of Trapezium =  $\frac{1}{2}$  × distance between || el sides × (Sum of parallel side)

$$24 = \frac{1}{2}(7 + x) \times 4$$

$$\frac{48}{4} = 7 + x$$

$$\boxed{x = 5}$$

155. (C)



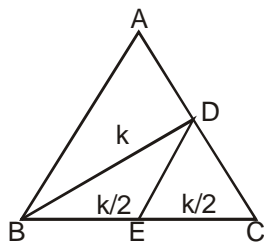
Area of APCD

$$\frac{1}{2} \left( \frac{l}{2} + l \right) \cdot b = 36$$

$$lb = 48 \text{ cm}$$

$$A = \frac{1}{2} \times lb = \frac{48}{2} = 24 \text{ cm}^2$$

156. (A)



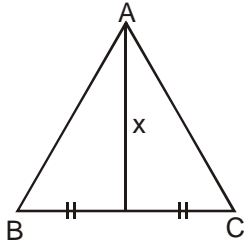
Area of  $\triangle BED = 12 \text{ cm}^2$

$$k/2 = 12$$

$$k = 24 \text{ cm}^2$$

$$\text{Area of } \square ABED = k + \frac{k}{2} = 24 + 12 = 36 \text{ cm}^2$$

157. (C)



$$\text{Area of } \triangle ABC = \frac{\sqrt{3}}{2} x^2$$

158. (C)

Area of square =  $x^2$

$$\text{Area of } \triangle = \frac{1}{2} \times x \times h$$

$$x^2 = \frac{1}{2} \times x \times h$$

$$h = \frac{2x^2}{x} = 2x$$

159. (A)

$$yx^2 + xy^2 = 2xy$$

$$xy(y + x) = 2xy$$

$$\boxed{x + y = 2} \text{ Linear equation}$$

160. (D)

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

## NTSE PART TEST-2 [STAGE-1] \_01-09-2017

## ANSWER KEY

MENTAL ABILITY

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

ENGLISH

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

SCHOLASTIC APTITUDE TEST

- |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|
| 101. (B) | 102. (B) | 103. (C) | 104. (D) | 105. (D) | 106. (D) | 107. (C) |
| 108. (D) | 109. (D) | 110. (B) | 111. (B) | 112. (C) | 113. (C) | 114. (C) |
| 115. (A) | 116. (D) | 117. (A) | 118. (B) | 119. (C) | 120. (A) | 121. (D) |
| 122. (D) | 123. (B) | 124. (C) | 125. (B) | 126. (B) | 127. (A) | 128. (B) |
| 129. (C) | 130. (C) | 131. (B) | 132. (A) | 133. (C) | 134. (A) | 135. (D) |
| 136. (D) | 137. (B) | 138. (B) | 139. (A) | 140. (A) | 141. (A) | 142. (D) |
| 143. (B) | 144. (B) | 145. (C) | 146. (C) | 147. (C) | 148. (C) | 149. (A) |
| 150. (A) | 151. (D) | 152. (B) | 153. (D) | 154. (A) | 155. (C) | 156. (A) |
| 157. (C) | 158. (C) | 159. (A) | 160. (D) | 161. (B) | 162. (B) | 163. (C) |
| 164. (D) | 164. (A) | 166. (B) | 167. (D) | 168. (C) | 169. (B) | 170. (A) |
| 171. (D) | 172. (C) | 173. (A) | 174. (C) | 175. (C) | 176. (B) | 177. (A) |
| 178. (C) | 179. (B) | 180. (D) | 181. (B) | 182. (D) | 183. (D) | 184. (C) |
| 185. (C) | 186. (B) | 187. (A) | 188. (D) | 189. (C) | 190. (B) | 191. (D) |
| 192. (B) | 193. (D) | 194. (A) | 195. (A) | 196. (D) | 197. (B) | 198. (B) |
| 199. (A) | 200. (B) |          |          |          |          |          |