# NTSE STAGE – I

# (2016- 17 )

# SCHOLASTIC APTITUDE TEST

# SOLUTIONS

## PHYSICS

101. $S_{nth} = u - \frac{1}{2}a(2n-1)$

$n = 2, n = 3, n = 5$

ratio = 3 : 5 : 9

102. $a = \frac{v^2 - u^2}{2}$ ; = length of the train.

$v^2 - u^2 = 2\frac{v^2 - u^2}{2} = \frac{}{2}$

$V = \sqrt{u^2 - V^2}$

$\backslash$ 2

103. Ratio = $\frac{2r \quad \frac{2r}{4}}{2r \qquad \frac{3}{2}}$

104. Resistance = $\frac{4x}{21}$ 3. 7

x 4

105. Using conservation of momentum

$M_1V_1 = M_2V_2$

$3 \times V_1 = 6 \times V_2$ …(i)

$\frac{1}{2}3\ V_1^2 = 216$

$V_1 = 12$ m/s ; $V_2 = 6$ m/s

106. Electrons are transferred from glass rod to silk.

107. $\frac{V_s}{V}$ Density of body

Density of liquid

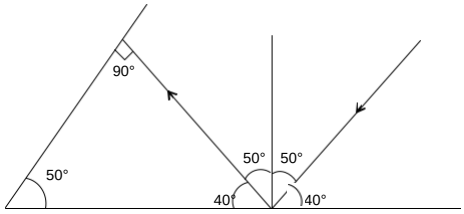
108. $T = 2\sqrt{\frac{}{g}}$

$T^2 = 4^2 \qquad T^2 \times$

g

Hence straight line.

109.




110. V = at
Hence straight line graph with +ve slope.

111. V = constant, a = 0, m = 80 kg
T = mg = 800 N

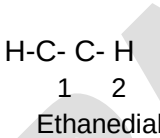
112. $P \frac{V_2}{R} \frac{110\ 110}{220\ 220} 40 = 10W$

113. Using right hand thumb rule.

114. Density of glass is more than water.

**CHEMISTRY**

115. $2C_4H_{10} \ 13O_2 \ 8CO_2 \ 10H_2O$
2 moles required 13 mole $O_2$
1 mole required $\frac{13}{2}$ mole $O_2$
3 mole required $\frac{13}{2} 3 = \frac{39}{2} = 19.5$ mole
Wt of $O_2$ required = 19.5 32 = 624 g

116.


Ethanedial

117. $2CH_3COOH \ Ca(OH)_2 \ Ca(CH_3COO)_2 \ 2H_2O$
280 mL, 0.5 = 140 $10^{-3}$ moles
1 mole required 2 moles $CH_3COOH$
140 $10^{-3}$ required 140 $10^{-3}$ 2 moles $CH_3COOH$ = 0.280 mole i.e
0.280 60 = 16.8 g

118. $MSO_4$
$M^2 SO^2_4$
i.e.,$M^2 PO^3_4$
$M_3(PO_4)_2$

119. $Na_2CO_3 \ 2HCl \ 2NaCl \ H_2O \ CO_2$

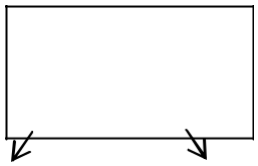
$\frac{5.3g}{106} = 0.05 = 5 \times 10^{-2}$ $250 = 125 \times 10^{-3}$ moles $\frac{1}{2} = 12.5 \times 10^{-2}$

Limiting reagent

$2 \times 5 \times 10^{-2} = 10^{-1}$ moles = 0.1 moles

i.e., 5.85 g

120.



50 % He 50 % $CH_4$

Suppose 22.4 L volume is present

i.e. 11.2 L He i.e. ½ mole He i.e. 2 g He

11.2 $L_{He}$ i.e. ½ mole $CH_4$ i.e. 8 g $CH_4$

$\%CH_4$ 100 80%

121. 60% Copper
20% Nickel
20% Zinc

122. The protective power of lyophillic collids is measure in term of gold number

123. Non reacting gases

$H_2:O_2$

1 : 4

$$\frac{w_{H_2}}{W_{O_2}} \quad \frac{1}{4}$$

$$\frac{W_H \; M_{O_2}}{M_H \; W_{O_2}}$$

$$\frac{n_{H_2}}{n_{O_2}} \quad \frac{1 \times 32}{4 \times 2} \quad \frac{4}{1}$$

124. X should be calcium(Ca – 2, 8, 8, 2)
CaO, Basic

125. Alitame used as sweetner

126.

| | | | |
|---|---|---|---|
| (a) | 0.5 mole $SO_2$ gas | (Q) | 11.2 L at S.T.P |
| (b) | 1 mole $H_2O$ | (P) | 10 moles of proton |
| (c) | 96g of $O_2$ gas | (S) | 6 moles of atoms |
| (d) | 88g of $CO_2$ gas | (R) | 2 moles |

127. Rancidity is the phenomenon of oxidation of oils and fat which lead to their foul smell and unpleasant odour.

128. Iodine is essential for the formation of thyroxine hormone. It is present in iodised salt.

129. Medulla oblongata helps to control blood pressure, salivation, vomiting where as body posture is controlled by cerebellum.

130. Glycolysis takes place in cytoplasm of the cell.

131. Oxygen rich blood carried out by pulmonary vein from lungs to left atrium of the heart.

132. Growth of pollen tube in the style towards the ovule in plants is an example of chemotropism

133. Urethra is the common passage of urine and sperm in human males.

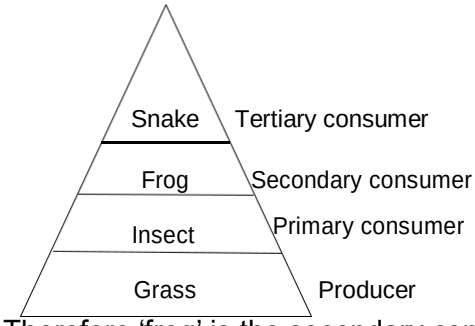
134. Pepsin is protein digesting enzyme which activated in acidic medium secreted by chief cells of stomach.

135. Bowman's capsule is apart of nephron in kidney.

136. 'Khadins' are used in Rajasthan for Rain Water Harvesting.

137. Sweating is not a reflex action.

138.




Therefore 'frog' is the secondary consumer.

139. Colour of seed of garden pea is an inherited trait.

140. Cholera is caused by vibrio cholerae and it is transmitted through contaminated food and water.

141. $\frac{y^4 \; x^4 \quad y^3}{x \; x \; y \quad x}$

$y^2 \quad xy \quad x^2$

$y^2 \quad x^2 \; y \quad x \quad y^3$

$x \; y^2 \quad xy \quad x^2$

$x \; y^2 \quad xy \quad x^2$

$x \; y^2 \quad xy \quad x^2$

142. a $\frac{4xy}{x \; y}$

$a2y \; , \; a2x$

$2x \quad x \; y \quad 2y \qquad x \; y$

By applying Componendo Dividendo

$\frac{a \; 2x}{a \; 2x} \quad \frac{3y \; x}{y \; x}$ and $\frac{a \; 2y}{a \; 2y} \quad \frac{3x \; y}{x \; y}$

So, $\frac{a \; 2x}{a \; 2x} \quad \frac{a \; 2y}{a \; 2y} \quad \frac{3y \; x}{y \; x} \quad \frac{3x \; y}{x \; y}$ 2

143. $\frac{x^2 \quad bx}{ax \quad c} \quad \frac{m \ 1}{m \quad 1}$

In standard form, given equation is m 1 $x^2$ x bm b ma a cm c 0 Since roots are equal in magnitude but opposite in signs

Sum of zeros = 0

or bm b ma a 0

m $\frac{a \ b}{a \quad b}$

144. By going through options

x 4, y 3, z 9

145. Let area of triangle ECG = x sq. units

ar AGE 2x sq. units

Now, ar AEC 3x sq. units

Since, BD = DE = EC

ar ABD ar ADE ar AEC

So, Area of triangle ABC = 9x sq units

Shaded area = 7x sq. units

Required ratio = $\frac{7x}{9x} \quad \frac{7}{9}$

146. A B $90^o$

$$\frac{\tan A.\tan B \ \tan A.\cot B}{\sin A.\sec B} \quad \frac{\sin^2 B}{\cos^2 A}$$

$$\frac{\cot B.\tan B \ \cot B \cot B}{\sin A.\operatorname{cosec} A} \quad \frac{\cos^2 A}{\cos^2 A}$$

$$\frac{1 \ \cot^2 B}{1} \quad 1$$

$\cot^2 B$

147. $\frac{1}{2^2 \ 1} \ \frac{1}{4^2 \ 1} \ \frac{1}{6^2 \ 1} \ \ldots\ldots \frac{1}{20^2 \ 1}$

$\frac{1}{133557} \ \frac{1}{\ldots\ldots\ldots} \ \frac{1}{19 \ 21}$

$\frac{1 \ 1 \ 1}{2 \ 1 \ 3} \ \frac{1 \ 1 \ 1}{2 \ 3 \ 5} \ \frac{1 \ 1 \ 1}{2 \ 5 \ 7} \ \ldots\ldots \frac{1 \ 1}{2 \ 19}$

$\frac{1}{2}$

$\frac{1 \ 1 \ 1 \ 1 \ 1 \ 1}{2 \ 1 \ 3 \ 5 \ 7} \ \ldots\ldots \frac{1 \ 1}{19 \ 21}$

$1 - \frac{1}{21}$

$\frac{1}{2} \ \frac{20}{21} \ \frac{10}{21}$

148. $2 \sin x \cos y \ 1 \ 2^o$

$\sin x \ \cos y \ 0$

let $\sin x \ a, \cos y \ b$

$a \quad b \quad 0$

$a^2 \quad b^2 \quad 2ab \quad 0$

$ab \quad \frac{1}{4}$

$16^{\sin^2 x \cos^2 y} \quad 4 \quad 16^{1/2}$

$\sin^2 x \quad \cos^2 y \quad \frac{1}{2}$

$a^2 \quad b^2 \quad 1 \quad 2$

$a \quad b \quad 0$

$a \quad 1 \quad 0 \; 4a$

$4a^2 \quad 1 \quad 0$

$1$

$a$

$b \quad a \quad 1$

$b$

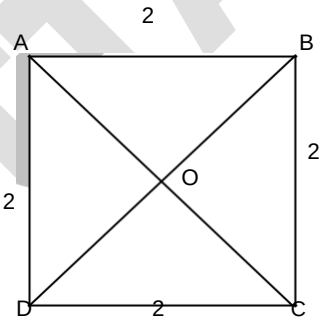
149. AB BC CD DA 2 cm AC

BD $2\sqrt{2}$

AOBOCODO $\sqrt{2}$

Sum of perimeter $2\sqrt{2} \; \sqrt{2} \; 4 \; 8 \; 8\sqrt{2} \; 8$

$1 \; \sqrt{2}$




150. Ar CEF $3^1$ Ar ABC

$6^1$ Ar ABCD

Ar CEF1 ABCD

6Ar

151. $10a \; b \; a \; b \; 4 \; 3 \; 10a \; b$

$3ab \; 5$

$b \quad 1$

$3b \; 3 \; 5 \; b \; 1 \; b \; 3 \; b \; 5 \; 2$

$5b \quad 5 \quad b \quad \frac{3}{2}b^2 \quad \frac{3}{2} \; b \; 5$

$\frac{3}{2}b^2 \quad \frac{9}{2}b \; 0$

$\frac{3b}{2}b \; 3 \quad 0 \; b \; 0$ as a $\frac{1}{s}$

b = 3

a = 2

Number is 23. Odd prime,

152. avg wt = total students = n

$\frac{n^2 \quad 21}{n \quad 1}\, n \quad n \qquad \frac{n^2 \; 18}{n \quad 1}$

$\frac{n^2 \quad 21 \quad n^2 \quad 19}{n \; 1}\, 2n$

$2n^2 \quad 40 \quad 2n^2 \quad 2n$

$n \quad 20$

153. $a \; b \; c \; d \; 125a \; 4 \; b \; 4 \; 4c \; \overline{t \; 4}^{\,d}$

$t \quad 4 \quad t \quad 4 \quad t \,/\, 4 \quad 4t \quad 125$

$\frac{25t}{4} \quad 125 \qquad t \quad 20$

$a \quad 24, b \quad 16$

$c \quad 5, d \quad 80$

154. $1^2 \quad 2^2 \quad 3^2 \quad 4^2 \quad 5^2 \quad 6^2 \quad 7^2 \quad 8^2$

$88 \quad 12 \quad 8 \quad 1 \quad 8 \quad 917 \qquad 1217 \qquad 204$

$6 \qquad\qquad 6$

155. $ar \; ADE \; ar \; BEC \; 1$

$ar \; DEC \; \frac{4}{2}$

$\frac{2}{2}$

$ar \; DFC \; \frac{2}{1}$

$\frac{2}{1}$

$ar \; DGC$

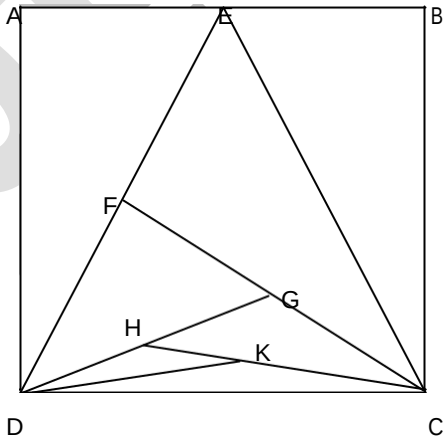
$\frac{2}{1}$

$ar \; DHC$

$\frac{4}{1}$

$ar \; DKC \qquad 1$

$42 \qquad 8$




156. $xy \; z, \; yz \; x, xz \; y \; x^2 \; y^2 \; z^2 \; xyz \; xyz \; 1$

$z^2 \quad 1 \quad z \quad 1$

$x \quad 1, y \quad 1$

$xy \quad zy \quad zx \quad 3$

157. $V \quad r^2h$

$S \quad 2\,rh \quad 2\,r^2$

$\frac{V}{S} \quad \frac{r^2}{2\,r \quad 2\,r^2}$

$\frac{1}{2} \; \frac{r}{1 \quad r} \; \frac{1}{2} \; 1 \; \frac{1}{r \; 1}$

158. $h \; 1.1h \; r$

$.9 \; h$

$Area \quad 2\,rh \quad 2\,1 .1 \quad 9rh$

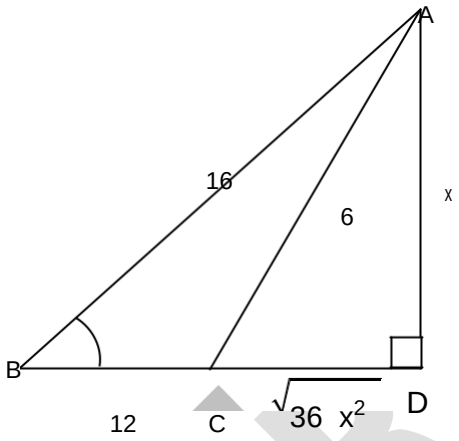
$.99 \; 2\,rh$

Decreases by 1%

159. $256\ x^2\ \ 144\ \ 36\ x^2\ \ \sqrt{24\ 36\ x^2}$

$\sqrt{36\ x^2}\ \ \frac{76}{24}\ \ \frac{19}{6}$

CD $\frac{19}{6}$




160. $x - 1 = 0$

$y\ 2\ 0$

$z\ \ 3\ \ 0$

$x\ \ 1, y\ \ 2, z\ \ 3$