

SCHOLASTIC APTITUDE TEST (SAT) PAPER

1. (4)

Sol. Time of Flight = 8 sec

$$\text{Time of Ascent} = \text{Time of Descent} = \frac{8}{2} = 4 \text{ sec}$$

$$\text{Height, } H = \frac{1}{2}gt^2$$

$$\frac{1}{2} \times 10 \times 4^2 = 80\text{m}$$

Velocity with which strike ground,

$$V = gt \\ = 10 \times 4 = 40 \text{ m/s}$$

2. **Bonus**

Sol. Let, Final temperature of mixture = $\theta^\circ\text{C}$

Heat loss by steam = Heat gain by ice

$$(200 \times 540) + (200 \times 1 \times (100 - \theta)) = (800 \times 80) + (800 \times 1 \times \theta)$$

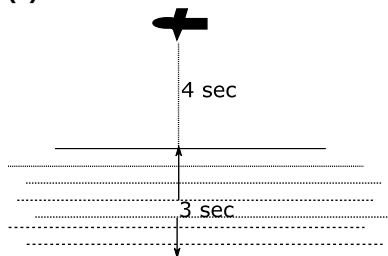
$$1000 \theta = 108000 + 20000 - 64000$$

$$\therefore \theta = \frac{64000}{1000} = 64^\circ\text{C}$$

All options are incorrect

3. (2)

4. (1)



Sol.

$$\text{Distance} = (4 \times 350) + (2 \times 1500)$$

$$= 1400 + 3000$$

$$= 4400\text{m}$$

$$= 4.4 \text{ km}$$

6. (2)

Sol. $\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1} = \frac{v_1}{v_2}$

$$\frac{\sin 45^\circ}{\sin 30^\circ} = \frac{3 \times 10^8}{1/2}$$

$$\frac{1/\sqrt{2}}{1/2} = \frac{3 \times 10^8}{v_2}$$

$$\sqrt{2} = \frac{3 \times 10^8}{v_2}$$

$$\therefore v_2 = \frac{3 \times 10^8}{\sqrt{2}} = 2.12 \times 10^8 \text{ m/s}$$

8. (2)

Sol. Given $I_2 = \frac{I_1}{3}$

$$V = 220 \text{ V}$$

$$P_1 = 1320 \text{ W}$$

$$P_2 = ?$$

$$\frac{P_1}{P_2} = \frac{VI_1}{VI_2} = 3$$

$$\therefore P_2 = \frac{P_1}{3} = 440 \text{ W}$$

9. (3)

Sol. $\text{Power} = \frac{\text{Work}}{\text{Time}} = \frac{250 \times 10 \times 150}{60} = \frac{37500}{6} \text{ W}$

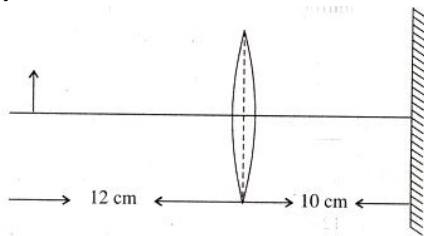
$$= \frac{37500}{6 \times 746} \text{ (horse power)}$$

$$= 8.36 \text{ (horse power)}$$

$$= 8 \text{ (horse power)}$$

11. (1)

Sol.



For Lens,

$$u = -12 \text{ cm}$$

$$F = +20 \text{ cm}$$

$$\frac{1}{V} = \frac{1}{f} + \frac{1}{u}$$

$$= \frac{1}{20} + \frac{1}{-12}$$

$$= \frac{3-5}{60}$$

$$\frac{1}{-30}$$

$$V = -30 \text{ cm}$$

For Mirror,

$$U = -(10 + 30) \text{ cm}$$

$$= -40 \text{ cm}$$

$$V = -u$$

$$= +40 \text{ cm}$$

∴ Final image is 40cm behind mirror.

13. (1)

Sol. $P = P_1 + P_2 + P_3$

$$2.7 = 2.5 + 1.7 + P_3$$

$$\therefore P_3 = -1.5 \text{ D}$$

81. (3)

Sol. $7, 14, 21, \dots, 994$

$$A = 7 \quad d = 7 \quad a_n = 994$$

$$a_n = a + (n-1)d$$

$$\Rightarrow 994 = 7 + (n-1)7$$

$$\Rightarrow 994 = 7n - 7 + 7 \Rightarrow n = 142$$

$$S_{m3} = S_{m3} = \frac{142}{2} [7 + 994] = 71071$$

82. (1)

Sol. $FV = 100$

$$MV = 120$$

$$D = 20\%$$

Let ror be 'x'

$$\frac{20}{120} = \frac{x}{100}$$

$$\text{Ans: } 16.67\%$$

83. (4)

Sol. $\frac{(x-1)(x+1)(x+7)}{(x+7)(x-7)} = x+1$

84. (2)

Speed of boat x kmph

Speed of stream y kmph

$$\frac{30}{x+y} = 3 \quad \frac{30}{x-y} = 5$$

$$x + y = 10 \dots\dots\dots(1)$$

$$x - y = 6 \dots\dots\dots(2) \quad x = 8 \text{ kmph}$$

85. (3)

Sol. $(2 + 4 + 6 + 8 + \dots\dots\dots 1000) - (1 + 3 + 5 + \dots\dots\dots 999)$

$$500 \times 501 - 500^2 = 500(501 - 500) = 500 \text{ Ans}$$

86. (1)

Sol. Median = $L + \left(\frac{\frac{n}{2} - CF}{f} \right) H$
 $= 50 + \left(\frac{50 - 38}{18} \right) 10 = 56.66$

87. (4)

Sol. a, b, c are in G.P

$$b = \sqrt{ac}$$

$$\Rightarrow 27 - x = \sqrt{(21 - x)(35 - x)}$$

$$\Rightarrow 729 + x^2 - 54x = 735 - 56x + x^2$$

$$\Rightarrow 2x = 6 \rightarrow x = 3 \rightarrow x^2 = 9$$

88. (1)

$$\frac{1}{2} \times D_1 D_2 = 96$$

Sol. $\Rightarrow D_1 D_2 = 192 \quad \Rightarrow D_1 - D_2 = 4$
 $\Rightarrow (D_1 + D_2)^2 - 4D_1 D_2 = 16$

$$(D_1 + D_2)^2 = 784 \Rightarrow D_1 + D_2 = 28$$

$$\Rightarrow D_1 - D_2 = 4 \rightarrow (1)$$

$$D_1 + D_2 = 28 \rightarrow (2)$$

By solving (1) and (2)

$$D_1 = 16$$

$$D_2 = 12.$$

Side of Rhombus 10cm

So Ans = 2cm

89. (2)

Sol. Let C.P. = x

$$x + 12\% \text{ of } x = 10304$$

$$\Rightarrow \frac{112x}{100} = 10304$$

$$\Rightarrow x = 9200 \text{ Rs.}$$

$$\text{GST Amount} = 1104$$

$$\text{SGST} = 552 \text{ Rs.}$$

90. (4)

$$3\sqrt{5}m - 30 = 0$$

Sol. $m = \frac{30}{3\sqrt{5}} = \frac{10 \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}} = 2\sqrt{5}$

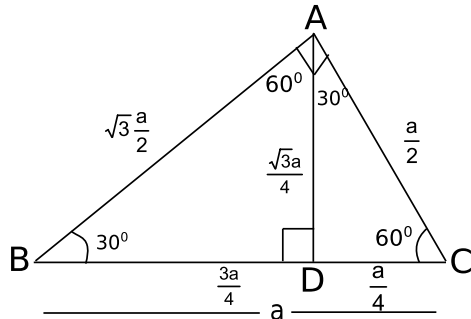
91. (1 and 4)

Sol. $\frac{\text{Ar}(\triangle APQ)}{\text{Ar}(\triangle ABC)} = \frac{1}{2} \Rightarrow \frac{AP}{AB} = \frac{1}{\sqrt{2}}$

$$\frac{BP}{AB} = \frac{\sqrt{2} - 1}{\sqrt{2}} = \frac{2 - \sqrt{2}}{2}$$

92. (2)

Sol.



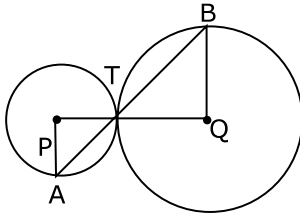
$$\frac{\text{perimeter of ABD}}{\text{Perimeter of ACD}} = \frac{(\sqrt{3} + 1)}{(3 + \sqrt{3})}$$

$$\text{Rationalize } \frac{(\sqrt{3} + 1)(3 - \sqrt{3})}{2}$$

$$= \frac{3\sqrt{3} + 3 - \sqrt{3} - 3}{2} = \frac{2\sqrt{3}}{2} = \sqrt{3}$$

93. (2)

Sol. Use similarity and angles are in alternate seg.
Si PA || BQ



94. (3)

Sol. By observation

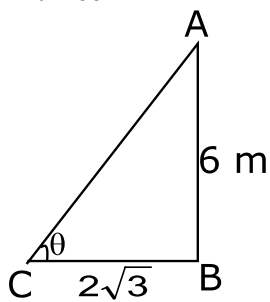
95. (4)

Sol. $\tan \theta = \frac{3}{\sqrt{3}}$

$$= \tan \theta = \sqrt{3}$$

$$= \tan \theta = \tan 60^\circ$$

$$= \theta = 60^\circ$$



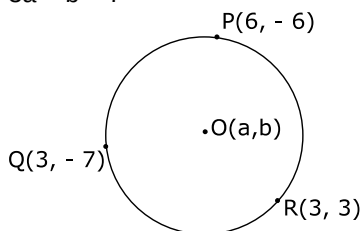
96. (1)

Sol. $OP^2 = OQ^2$

$$(a - 6)^2 + (b + 6)^2 = (a - 3)^2 + (b + 7)^2$$

$$6a + 2b = 14$$

$$3a + b = 7$$



$$OQ^2 = OR^2$$

$$(a - 3)^2 + (b + 7)^2 = (a - 3)^2 + (b - 3)^2$$

$$(b + 7)^2 = (b - 3)^2$$

$$b^2 + 14b + 49 = b^2 - 6b + 9$$

$$20b = -40$$

$$b = -2$$

$$a = 3$$

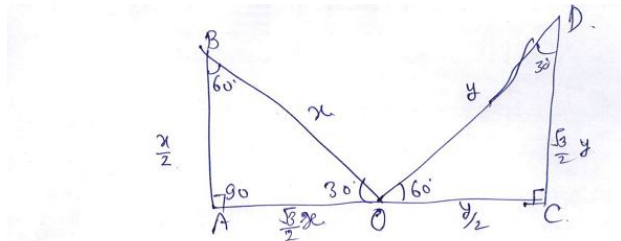
97. (3)

Sol. let Height of Cuboid = H

$$\frac{1}{3} \times \pi \times 7^2 \times 9 = 6 \times 11 \times H$$

By solving $H = 7$ cm

98. (4)



Sol.

Given $\frac{\sqrt{3}x}{2} = \frac{y}{2}$ $y = \sqrt{3}x$

$$\frac{h_1}{h_2} = \frac{\frac{2}{2}}{\frac{\sqrt{3}}{2}y} = \frac{x}{\sqrt{3}y} = \frac{1}{3}$$

99. (4)

Sol. Length of wire = ℓ radius of wire = $\frac{1}{5}$ cm

$$\frac{4}{3} \times \pi \times 3^3 = \pi \times \left(\frac{1}{5}\right)^2 \times \ell$$

$$\ell = 36 \times 25$$

$$\ell = 900 \text{ cm} = 9 \text{ m}$$

100. (2)

$$\triangle ADB \sim \triangle ABC$$

$$\Rightarrow \frac{AD}{AB} = \frac{AB}{AC}$$

Sol.

$$\Rightarrow \frac{8}{b} = \frac{b}{18} \Rightarrow b^2 = 144$$

$$b = 12\text{cm}$$