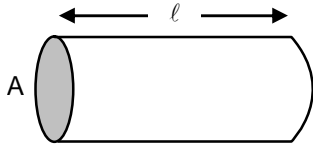


**PAPER & SOLUTION**

1. [A]

Sol.



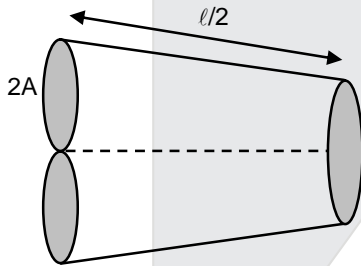
Length =  $l$

Area =  $A$

$$R = \rho \frac{l}{A}$$

$$4\Omega = \rho \frac{l}{A}$$

given



$$R' = \rho \frac{l/2}{2(2A)}$$

$$R' = \frac{\rho l}{4A} = \frac{4}{4} = 1\Omega$$

5. [A]

Sol. Let Celsius and Fahrenheit Scale be  $x$

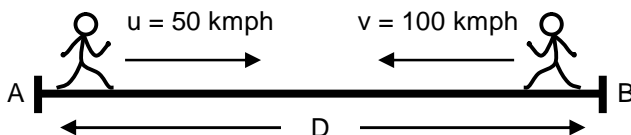
According to formula,

$$F = \frac{9C}{5} + 32 \quad \left[ \begin{array}{l} F - \text{Fahrenheit Scale} \\ C - \text{Celsius Scale} \end{array} \right]$$

$$x = \frac{9x}{5} + 32$$

$$x = -40^\circ$$

6.



$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$\Rightarrow \frac{D + D}{t_1 + t_2}$$

$$\Rightarrow \frac{2D}{\frac{D}{u} + \frac{D}{v}}$$

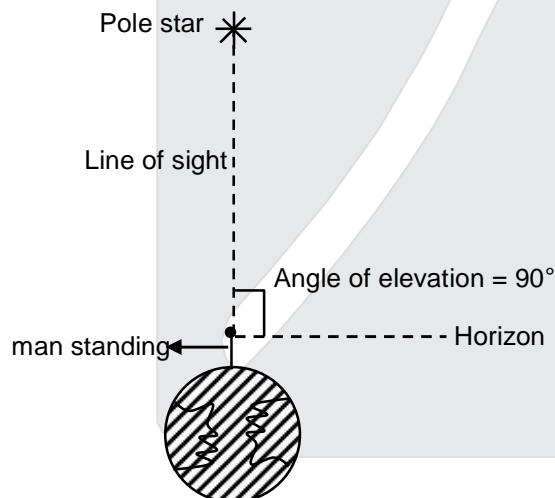
$$\Rightarrow \frac{2D}{d + \left(\frac{u+v}{uv}\right)}$$

$$\Rightarrow \frac{2uv}{u+v}$$

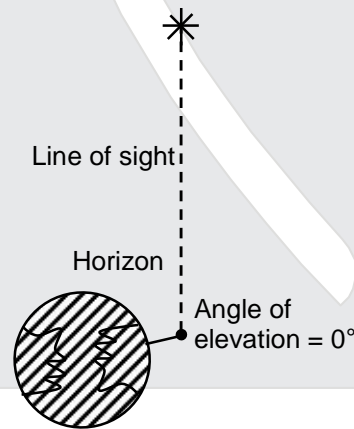
$$\Rightarrow \frac{2 \times 50 \times 100}{50 + 100}$$

$$\Rightarrow 75 \text{ kmph}$$

7. At Pole (latitude = 90°)



At Equator (latitude = 0°)



with the two pictures it is clear that latitude angle is equivalent to angle of elevation.

8. Series resistance (equivalent) > Any single resistance  $R_s > R_1$

Parallel resistance (equivalent) < Any single resistance  $R_p < R_1$ .

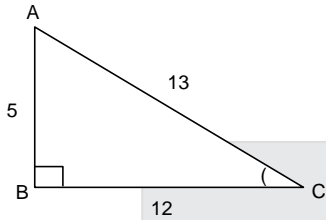
81. If  $\cos A = \frac{9}{41}$ ,  $\frac{B}{H}$

Let  $B = 9x$ ,  $H = 41x$ , Then  $P = 40x$

Then (1)  $\cot A = \frac{B}{P} = \frac{9x}{40x} = \frac{9}{40}$

$$(2) \operatorname{cosec} A = \frac{H}{P} = \frac{41x}{40x} = \frac{41}{40}$$

82.  $\sin C = \frac{AB}{AC} = \frac{5}{13}$



83.  $(\sec \theta + \tan \theta)(1 - \sin \theta)$

$$\left( \frac{1}{\cos \theta} + \frac{\sin \theta}{\cos \theta} \right) (1 - \sin \theta)$$

$$= \frac{(1 + \sin \theta)(1 - \sin \theta)}{\cos \theta} = \frac{1 - \sin^2 \theta}{\cos \theta} = \frac{\cos^2 \theta}{\cos \theta}$$

$$= \cos \theta$$

84. If  $\tan \theta = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30^\circ$

$$\text{Then } \left( \frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \sec^2 \theta} \right) = \left( \frac{\frac{1}{\sin^2 \theta} - \frac{1}{\cos^2 \theta}}{\frac{1}{\sin^2 \theta} + \frac{1}{\cos^2 \theta}} \right)$$

$$= \left( \frac{\cos^2 \theta - \sin^2 \theta}{\cos^2 \theta + \sin^2 \theta} \right) = (\cos^2 \theta - \sin^2 \theta)$$

Put  $\theta = 30^\circ$

$$\Rightarrow \cos^2 30^\circ - \sin^2 30^\circ$$

$$\Rightarrow \left( \frac{\sqrt{3}}{2} \right)^2 - \left( \frac{1}{2} \right)^2 \Rightarrow \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

**Ans is not given in options.**

85.  $D \geq 0$  (for real roots)

$$(b^2 - ac) \geq 0$$

$$(2)^2 - 4(3)(k) \geq 0$$

$$4 - 12k \geq 0 \Rightarrow 4 \geq 12k$$

$$12k \leq 4$$

$$k \leq \frac{1}{3} \quad \text{Option (A)}$$

86. let, her age is = x yr

ATQ

$$\Rightarrow (x - 5)(x + 8) = 30$$

$$\Rightarrow x^2 + 3x - 40 = 30$$

$$\Rightarrow x^2 + 3x - 70 = 0$$

$$\Rightarrow (x + 10)(x - 7) = 0$$

$$\Rightarrow x = 7 \text{ year} \Rightarrow x = -10 \text{ is not possible Option (C)}$$

87. If b = 3h meter

$$\text{Then area} = \frac{1}{2} \times b \times h$$

$$\Rightarrow 96 = \frac{1}{2} \times 3h \times h$$

$$\Rightarrow h^2 = 64$$

$$\Rightarrow h = 8 \text{ m}$$

$$\text{Then, base} = 3(8) = 24 \text{ m}$$

88. In a leap year = 52 week + 2 days

fav. outcomes = {SM, SS}

Total outcomes = {SM, MT, TW, WTh, ThF, FS, SS}

$$P(\text{53 Sunday}) = \frac{2}{7}$$

89. Total face cards = 12

$$P(\text{face card}) = \frac{\text{fav. outcomes}}{\text{Total outcomes}} = \frac{12}{52} = \frac{3}{13}$$

90.  $p = 2(\ell + b) = 206$

$$\Rightarrow (\ell + b) = 103 \quad \dots\dots\dots (1)$$

$$\text{also, } \Rightarrow \ell = b + 23 \quad \dots\dots\dots (2)$$

from (1) & (2)

$$\Rightarrow 2b + 23 = 103$$

$$\Rightarrow 2b = 80$$

$$\boxed{b = 40}$$

Then

$$\Rightarrow l = 40 + 23$$

$$l = 63$$

Then, Area =  $l \times b$

$$= 63 \times 40 = 2520 \text{ m}^2$$

**Option (D)**

91. T.S.A. =  $6a^2 = 864 \text{ cm}^2$

(cube)  $a^2 = 144 \text{ cm}^2$

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

Volume of cube ( $a^3$ ) =  $12 \times 12 \times 12 = 1728 \text{ cm}^3$

**Option (C)**

92. Length of longest pole =  $\sqrt{l^2 + b^2 + h^2}$

$$= \sqrt{12^2 + 9^2 + 8^2}$$

$$= \sqrt{144 + 81 + 64}$$

$$= \sqrt{289} = 17 \text{ m}$$

**Option (B)**

93. Let point P(a, 0),

ATQ

$$PA = PB$$

$$\Rightarrow (PA)^2 = (PB)^2$$

$$\Rightarrow (a - 7)^2 + (6 - 0)^2 = (a + 3)^2 + (4 - 0)^2$$

$$\Rightarrow a^2 - 14a + 49 + 36 = a^2 + 9 + 6a + 16$$

$$\Rightarrow 60 = 20a$$

$$\Rightarrow a = 3$$

Hence, point is P(3, 0)

**Options - C**

94. A (0, 6), B (-5, 3), C (3, 1)

$$AB = \sqrt{(0 + 5)^2 + (6 - 3)^2} = \sqrt{25 + 9} = \sqrt{34}$$

$$BC = \sqrt{(3 + 5)^2 + (3 - 1)^2} = \sqrt{64 + 4} = \sqrt{68}$$

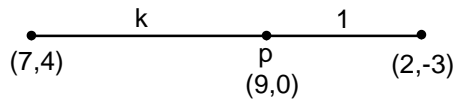
$$AC = \sqrt{(0 - 3)^2 + (1 - 6)^2} = \sqrt{9 + 25} = \sqrt{34}$$

Since,  $AB = AC \Rightarrow$  Isosceles Triangle

Also,  $(AB)^2 + (AC)^2 = (BC)^2 \Rightarrow$  Right angled.

$\Rightarrow$  Option A & C both.

95. Let Ratio is K : 1



$$\Rightarrow P\left(\frac{2K+7}{K+1}, \frac{-3K+4}{K+1}\right) \equiv (9, 0)$$

By equating y - coordinate

$$\left(\frac{-3K+4}{K+1}\right) = 0$$

$$K = \frac{4}{3} \quad \text{or} \quad \frac{2}{1.5}$$

96. If  $x \in A \cup B$

$\Rightarrow$  option B is correct

$\Rightarrow \{x | x \in A \text{ or } x \in B\}$

97. By property

$$A \cap \phi = \phi$$

98. Let CP of one thing = x Rs

$$\text{SP of that thing} = \left(\frac{3x}{2}\right) \text{Rs}$$

$$\text{Profit} = \text{SP} - \text{CP} = \left(\frac{3x}{2}\right) - (x) = \left(\frac{x}{2}\right) \text{Rs.}$$

$$\% P = \left(\frac{p}{Cp} \times 100\right) = \left(\frac{\left(\frac{x}{2}\right)}{x} \times 100\right)$$

$$= 50 \%$$

Option = D

99. Let CP for 'A' is = Rs. x

$$\Rightarrow \text{SP of 'A'} = \text{CP of B} = \left(\frac{120}{100}x\right)$$

$$\Rightarrow \text{SP of B} = \text{CP of C} = \frac{125}{100} \left(\frac{120}{100}x\right)$$

ATQ

$$\left(\frac{125}{100}\right) \left(\frac{120}{100} x\right) = 225$$

$$\Rightarrow \frac{5}{4} \times \frac{6}{5} x = 225$$

$$\Rightarrow \frac{3x}{2} = 225$$

$$\Rightarrow 3x = 450$$

$$x = 150 \text{ Rs}$$

Option (D)

100.

$$h = 14 \text{ cm}$$

$$\text{C.S.A} = 264 \text{ cm}^2$$

$$\Rightarrow 2\pi r \times 14 = 264$$

$$\Rightarrow 2 \times \frac{22}{7} \times r \times 14 = 264$$

$$\Rightarrow 88 r = 264$$

$$r = 3 \text{ cm}$$

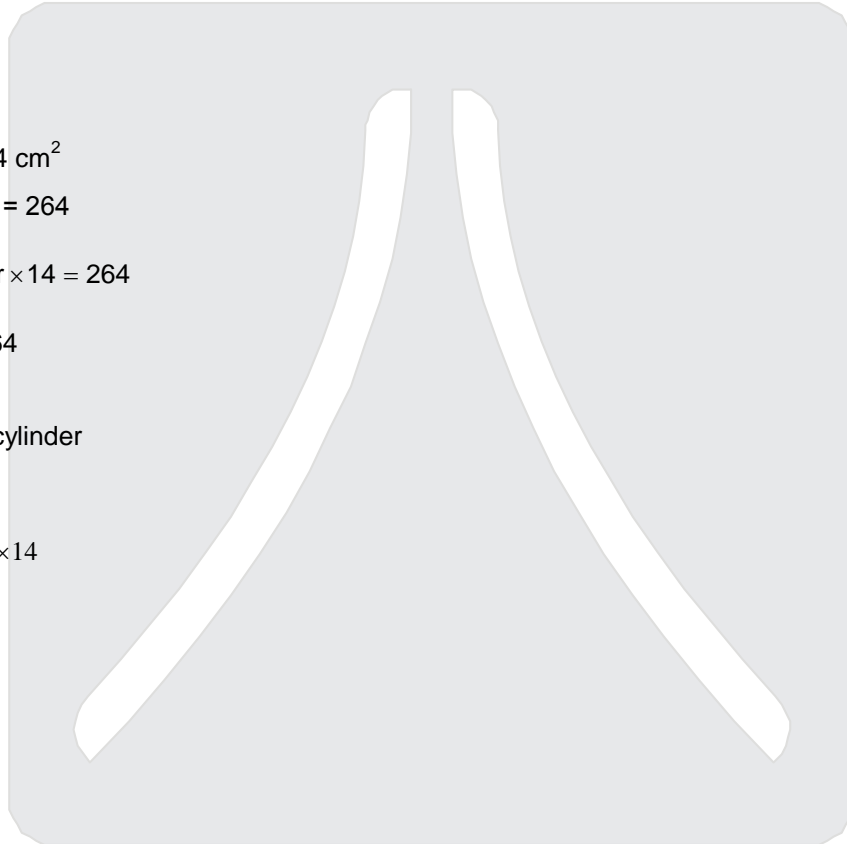
Volume of cylinder

$$= \pi r^2 h$$

$$= \frac{22}{7} \times 3 \times 3 \times 14$$

$$= 22 \times 18$$

$$= 396 \text{ cm}^2$$





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