RIGHT CIRCULAR CONE

1. The cost of canvas required for a conical tent, of height 4 m and diameter of base 6 m, at the rate of Rs 7 per m^2 is :

(A) Rs 420 (B) Rs 300 (C) Rs 340 (D) Rs 330

Sol. **(D)**

$$\text{Surface area of conical tent} = \pi r\sqrt{r^2+h^2}$$

$$= \sqrt{16+9}.\Pi.3 = = 15\ \pi\ m^2$$

$$\text{Rate per } m^2 = 7.$$

$$\text{Total Cost} = 7 \times 15\ \pi = = 330.$$

2. A right circular cylinder and a right circular cone, both have the same radius and height, then the ratio of their volumes is A/B, then A+B is :

(A) 6 (B) 4 (C) 5 (D) 3

Sol. **(B)**

$$\text{Volume of a right circular cylinder} = \pi r^2 h$$

$$\text{Volume of a right circular cone} = \frac{1}{3}\pi r^2 h$$

$$\text{required ratio} = \frac{\pi r^2 h}{\frac{1}{3}\pi r^2 h} = 3:1.$$

3. A hall has dimensions 24 m × 8 m × 6 m. The length of the longest pole which can be accommodated in the hall is :

(A) 26 m (B) 28 m (C) 30 m (D) 36 m

Sol. **(A)**

$$\text{Length of the longest pole} = \sqrt{(24)^2+(8)^2+(b)^2(6)^2}$$

$$= 26 \text{ m}.$$

4. The slant height of a cone is increased by a%. If radius remains same, the curved surface area is increased by.

(A) a % (B) a^2 % (C) 2a % (D) None of these

Sol. **(A)**

Let the radius and slant height of a cone be r and l respectively. Then its curved surface area is πrl. Now l in increased by a% then increased curved surface area = $\Pi rl(1+a/100)$

$$\%\text{ increase in surface area} = \frac{\pi rl\left(1+\frac{P}{100}\right)-\pi rl}{\pi rl}\times 100\%$$

$$= \text{a }\%.$$

5. A cone, whose height is 1/128 of its radius, is melted to form a sphere. Find the ratio of radius of the sphere to that of the cone.

(A) 1 : 3 (B) 1 : 8 (C) 2 : 3 (D) 1 : 2

Sol. **(B)**

$$\text{Volume of the cone} = 1/3\Pi r2(r/32).1/4$$

$$\text{Volume of the sphere} = \frac{4}{3}\pi R^3 \text{ ; where } R \text{ and } r$$

are radii of sphere and cone respectively.

Given that $1/4.\Pi r^3/96 = \frac{4}{3}\pi R^3$

$$\Rightarrow \frac{R^3}{r^3} = 1/512$$

$$\Rightarrow \frac{R}{r} = 1/8$$

6. A sphere, a cylinder and a cone are of the same height and same radius then the ratio of their curved surfaces is :

(A) 4 : $\sqrt{5}$: 4 (B) $\sqrt{5}$: 4 : 4 (C) 4 : 4 : $\sqrt{5}$ (D) None

Sol. **(C)**

As Given that height of all three are same, so if r be the radius and h be the height then

$$h = 2r$$

Now C.S.A. of the sphere $= 4\pi r^2$

C.S.A. of the cylinder $= 2\pi rh = 2\pi r\,(2r) = 4\pi r^2$

$$\text{C.S.A. of the cone} = \pi r\sqrt{r^2+h^2} = \pi r\sqrt{r^2+(2r)^2} = \sqrt{5}\pi r^2$$

So their ratios are $4\pi r^2 : 4\pi r^2 : \sqrt{5}\pi r^2$

$$\Rightarrow 4 : 4 : \sqrt{5}$$

.7. A right triangle with its sides 6 cm, 8 cm and 10 cm is revolved about the side 8 cm. Find the volume of the solid so formed.

(A) 309 cm3 (B) 301.71 cm3 (C) 301.2 (D) None

Sol. **(B)**

Sol. Let ABC be a right triangle with AB = 8 cm, BC = 6cm and AC = 10 cm. When this triangle is revolved about AB, it forms a right circular cone of radius = BC = 6 cm and height AB = 8 cm.

$\therefore$ Volume of the solid formed = Volume of the cone of radius 6cm and height 8 cm

$$= \frac{1}{3}.\Pi.(6.6)8 \text{ cm3}$$

$$= 301.71 \text{ cm}^3$$

8. A cone of height 24 cm has a curved surface area 550 cm^2. Find its volume. (Take $\pi = 22/7$).

(A) 1342 cm3 (B) 1232 cm3 (C) 1096 cm3 (D) 1228 cm3

Sol. (B)

Sol. Let r cm be the radius of the base and ℓ cm the slant height. Then,

$\ell^2 = r^2 + 24^2$ [Using : $\ell^2 = r^2 + h^2$]

$\Rightarrow \quad \ell^2 = r^2 + 576 \Rightarrow \ell = \sqrt{r^2 + 576}$ ....(i)

Now, Curved surface area = 550 cm^2

$\Rightarrow \quad \pi r\ell = 550$

$\Rightarrow \quad \frac{22}{7} \times r \times \sqrt{r^2 + 576} = 550$

$\Rightarrow \quad r\sqrt{r^2 + 576} = 550 \times \frac{7}{22}$

$\Rightarrow \quad r\sqrt{r^2 + 576} = 25 \times 7$

$\Rightarrow \quad r^2(r^2 + 576) = (25 \times 7)^2$

$\Rightarrow \quad r^4 + 576r^2 - (25^2 \times 7^2) = 0$

$\Rightarrow \quad r^4 + 576r^2 - (625 \times 49) = 0$

$\Rightarrow \quad r^4 + 625r^2 - 49r^2 - 625 \times 49 = 0$

$\Rightarrow \quad (r^2 + 625) - 49(r^2 + 625) = 0$

$\Rightarrow \quad (r^2 + 625)(r^2 - 49) = 0$

$\Rightarrow \quad r^2 - 49 = 0$

$\Rightarrow \quad r = 7$ $[\because r^2 + 625 \neq 0]$

$\therefore \quad$ Volume $= \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24\ cm^3 = 1232\ cm^3$

9. The base diameter of a solid in the form of a cone is 16 cm and the height of the cone is 10 cm. It is melted and recast into spherical balls of diameter 2 cm. Find the number of balls, thus obtained.

(A) 130 (B) 124 (C) 160 (D) 122

Sol.(C) Let the number of spherical balls be n. Then, the volume of the cone will be equal to the sum of the volumes of the spherical balls.

The radius of the base of the cone = 16/2cm = 8 cm

and the radius of the sphere = 1 cm.

Now, the volume of the cone = $\frac{1}{3}\pi \times 8^2 \times 10\ cm^3$

and the volume of each sphere = $\frac{4}{3}\pi\ 1cm^3 = 4/3\pi\ cm^3$

Hence, we have $n4/3\pi = 640/3\pi \Rightarrow n = 160$

Hence, the required number of balls = 160

10. The radius and height of a cone are in the ratio 3 : 4. If its volume is 12 Π cm^3, find its slant height.

(A) 10 (B) 12 (C) 4 (D) 22

sol. As per data r/h=3/4

so, $\frac{1}{3}\Pi(3/4h)^2.h = 12\Pi$

so h=4 cm.

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