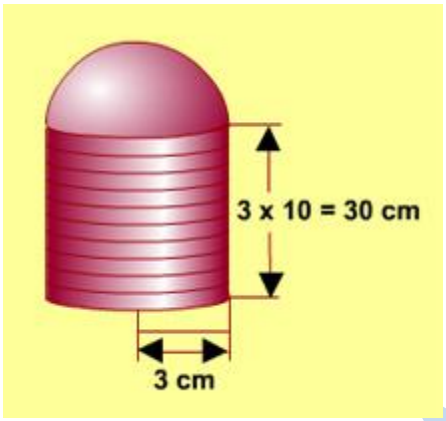
6. 10 circular plates each of thickness 3 cm are placed one above the other and a hemisphere of diameter 6 cm is placed on the top just to cover the cylindrical solid. What is the volume of the solid so formed?

264π cubic cm

252π cubic cm

236π cubic cm

None of the above



Answer (d)

V = volume of cylinder + volume of hemisphere
$= \pi r^2 h + (2\pi r^3)/3$
$= \pi r^2 (h + 2r/3)$
$= \pi \times 9 \times (30 + 6/3)$
$= \pi \times 9 \times 32$
$= 288\pi \text{ cm}^2$

7. A large solid metallic cylinder whose radius and height are equal to each other is to be melted and 48 identical solid balls are to be recast from the liquid metal so formed. What is the ratio of the radius of a ball to the radius of the cylinder?

1 : 16

1 : 12

1 : 8

1 : 4

Answer (d)

Let the radius of the cylinder be R and radius of the sphere be r
$\therefore \pi R^2 \times R = (48 \times 4\pi r^3)/3$
$\Rightarrow R^3 = 64r^3$
$\Rightarrow (R/r)^3 = (4)^3$
$\Rightarrow R : r = 4 : 1$
$\Rightarrow r : R = 1 : 4$

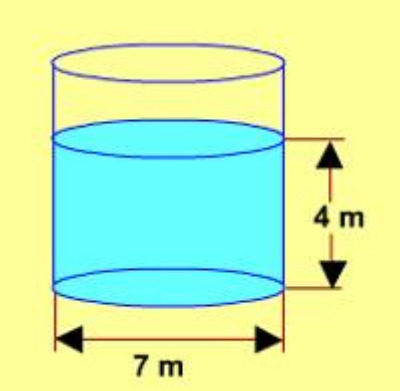
8. A cylindrical tank 7 m in diameter, contains water to a depth of 4 m. What is the total area of wetted surface?

110 m^2

126.5 m^2

131.5 m^2

136.5 m^2



Answer (b)

Wet surface = curved surface upto water level + bottom circle
radius of the cylinder r = 7/2
height of the cylinder h = 4
Area of wetted surface = Curved surface area of the cylinder + Area of base circle = $2\pi rh + \pi r^2$
$\Rightarrow \pi r(2h + r)$

$$\Rightarrow \frac{22 \times 7}{7 \times 2}(8 + 3.5)$$

$\Rightarrow 11 \times 11.5 = 126.5\ m^2$

9. A cylindrical vessel of height 10 cm has base radius 60 cm. If d is the diameter of a spherical vessel of equal volume, then what is d equal to?

30 cm

60 cm

90 cm

120 cm

Answer (b)

Volume of the cylinder with radius 60 cm and height 10 cm = volume of the sphere with radius d/2 cm

$$\therefore \frac{4\pi d^3}{3 \times 2^3} = \pi \times 60 \times 60 \times 10$$

$$\Rightarrow \frac{\pi d^3}{6} = \pi \times 60 \times 60 \times 10$$

$$\Rightarrow d^3 = 60 \times 60 \times 60$$

$$\Rightarrow d = 60 \text{ cm}$$

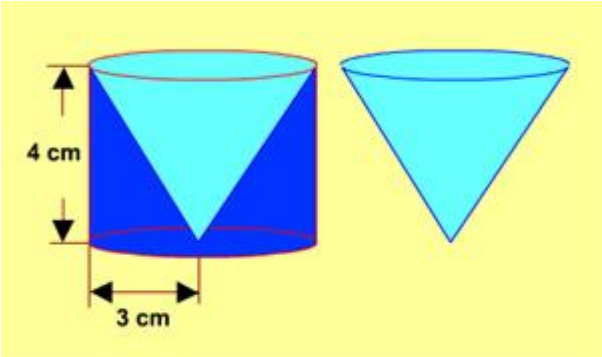
10. From a solid cylinder of height 4 cm and radius 3 cm, a conical cavity of height 4 cm and of base radius 3 cm is Followed out. What is the total surface area of the remaining solid?

15π square cm

22π square cm

33π square cm

48π square cm



Answer (d)

Total surface area of remaining solid
= CSA of cone + CSA of cylinder + area of base of cylinder
Slant height l of the cone = $\sqrt{(3^2 + 4^2)} = 5$
Height of the cylinder = 4 cm
Radius of the cylinder as well as the cone = 3 cm
Total surface area
= $\pi rl + 2\pi rh + \pi r^2$
= $\pi r(l + 2h + r)$
= π x 3 x (5 + 2 x 4 + 3)
= π x 3 x 16
= 48π cm^2

11. The radii of two cylinders are in the ratio 2 : 3 and their curved surface areas are in the ratio 5 : 3. What is the ratio of their volumes?

20 : 27

10 : 9

9 : 10

27 : 20

Answer (b)

$$\frac{r_1}{r_2} = \frac{2}{3} \text{ or } r_1 = 2r_2/3$$

$$\frac{CSA_1}{CSA_2} = \frac{2\pi r_1 h_1}{2\pi r_2 h_2} = \frac{2 \times h_1}{3 \times h_2} = \frac{5}{3}$$

$$\frac{h_1}{h_2} = \frac{5 \times 3}{3 \times 2} = \frac{5}{2}$$

$$\frac{Volume_1}{Volume_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{\pi \times 2^2 \times 5}{\pi \times 3^2 \times 2} = \frac{20}{18} = \frac{10}{9}$$