

12. 10 cylindrical pillars of building have to be painted. The diameter of each pillar is 70 cm and the height is 4 m. What is the cost of painting at the rate of Rs. 5 per square metre?

Rs. 400

Rs. 440

Rs. 480

Rs. 500

Answer (b)

$$r = 35 \text{ cm} = 35/100 \text{ m} = 7/20 \text{ m}$$

$$h = 4 \text{ m}$$

$$\text{Curved surface area of 1 pillar} = 2\pi rh$$

$$\text{Curved surface area of 10 pillars} = 10 \times 2\pi rh = 20\pi rh$$

$$\text{Total cost} = \text{Rs. } 5 \times 20\pi rh = \text{Rs. } 100 \times \frac{22 \times 7 \times 4}{7 \times 20} = \text{Rs } 440$$

13. The curved surface of cylinder is 1000 cm^2 . A wire of diameter 5 mm is wound around it, so as to cover it completely. What is the length of the wire used?

22 m

20 m

18 m

None of the above

Answer (b)

Let the no of turns the wire makes on the cylinder be n

$$\therefore \text{the height of the cylinder} = \text{diameter of the wire} \times n = 5 \times n \text{ mm or } 0.005 \text{ m} \dots(1)$$

Let the length of wire needed be $L \text{ m}$

But the wire makes n turns over the cylinder, so it can also be expressed as

$$L = 2\pi r \times n$$

$$\Rightarrow L/n = 2\pi r \dots(2)$$

$$\text{Curved surface area of the cylinder} = 2\pi rh$$

$$2\pi rh = 1000 \text{ cm}^2 = 0.1 \text{ m}^2$$

$$0.005n \times L/n = 0.1 \dots \text{substituting from (1) and (2) above}$$

$$\Rightarrow L = 0.1/0.005 = 100/5 = 20 \text{ m}$$

14. A cylindrical rod of iron whose radius is one-fourth of its height is melted and cast into spherical balls of the same radius as that of the cylinder. What is the number of spherical balls?

2

3

4

5

Answer (b)

Let the radius of the cylindrical rod of iron be r , so that the height of the rod is $4r$.

Volume of the rod = $\pi r^2 \times 4r$

Volume of each spherical ball = $\frac{4\pi r^3}{3}$

$$\text{No. of spherical balls} = \frac{\pi r^2 \times 4r \times 3}{4\pi r^3} = 3$$

15. A solid cylinder of height 9 m has its curved surface area equal to one-third of the total surface area. What is the radius of the base?

9 m

18 m

27 m

30 m

16. Half of a large cylindrical tank open at the top is filled with water and identical heavy spherical balls are to be dropped into the tank without spilling water out. If the radius and the height of the tank are equal and each is four times the radius of a ball, what is the maximum number of balls that can be dropped?

12

24

36

48

Answer (b)

If the radius of the tank is R and the radius of spherical balls is r , then $R = 4r$

Also, the volume of all the spherical balls = half the volume of the tank i.e $(\pi R^2 h)/2$

or $(\pi R^3)/2$ (since $R = h$)

or $[\pi(4r)^3]/2$ (since $R = 4r$)

or $32\pi r^3$

Volume of spherical ball = $(4\pi r^3)/3$

If the number of balls that can be dropped is n then

$n \times (4\pi r^3)/3 = 32\pi r^3$

$$n = \frac{3 \times 32 \times \pi \times r^3}{4 \times \pi \times r^3} = 24$$

17. A cylinder having base of circumference 60 cm is rolling without sliding at a rate of 5 rounds per second. How much distance will the cylinder roll in 5 seconds?

15 m

1.5 m

30 m

3 m

Answer (a)

Distance travelled in one round = $2 \times \pi \times r = 60$ cm

Distance travelled in 1 second = 5×60 cm = 3 m

Therefore Distance travelled in 5 seconds = 15 m.