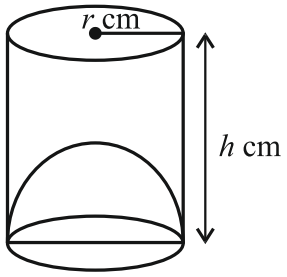
UDAAN 2024

Surface Areas and Volumes

DHA-03

1. The capacity of a cylindrical vessel with a hemispherical portion raised upward at the bottom as shown in the figure is $\frac{\pi r^2}{3}[3h-2r]$.



(A) $\frac{1}{3}\pi r^2[2h-3r]$ (B) $\frac{2}{3}\pi r^2[3h-2r]$

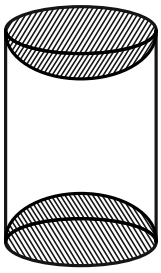
(C) $\frac{1}{3}\pi r^2[3h-2r]$ (D) None of these

2. From a solid circular cylinder with height 10 cm and radius of the base 6 cm, a right circular cone of the same height and same base is removed, then the volume of remaining solid is:

(A) 280 π cm^3 (B) 330 π cm^3

(C) 240 π cm^3 (D) 440 π cm^3

3. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article.



(A) 374 cm^2 (B) 370 cm^2

(C) 475 cm^2 (D) None of these

4. A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas as cloth is required to just cover the heap?

(A) 105.5 m^2 (B) 471.42 m^2

(C) 173.5 m^2 (D) None of these

5. The rain water from a roof of dimensions 22 m × 20 m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the rain water collected from the roof just fill the cylindrical vessel, then find the rainfall (in cm).

6. If volumes of two spheres are in the ratio 64 : 27, then find the ratio of their surface areas.

7. Water flows at the rate of 10 m min^{-1} through a cylindrical pipe 5 mm in diameter. How long would it take to fill a conical vessel whose diameter at the base is 40 cm and depth 24 cm?

8. Water flows through a cylindrical pipe, whose inner radius is 1 cm, at the rate of 80 cm s^{-1} in an empty cylindrical tank, the radius of whose base is 40 cm. What is the rise of water level in tank in half an hour?

9. Marbles of diameter 1.4 cm are dropped into a cylindrical beaker of diameter 7 cm containing some water. Find the number of marbles that should be dropped into the beaker, so that the water level rises by 5.6 cm.

10. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 3 cm and the diameter of the base is 4 cm. Determine the volume of the solid toy. If a right circular cylinder circumscribes the toy, then find the difference of the volumes of the cylinder and the toy. [Take, π = 3.14]

Note: Kindly find the Video Solution of DHAs Questions in the DPP Section.

Answer Key

1. (C)

2. (C)

3. (A)

4. (B)

5. (2.5 cm)

6. $\frac{16}{9}$

7. 51 min. 12 sec.

8. (90 cm)

9. (150)

10. 33.49 cm^3

Hints and Solutions

1. (C) $\frac{1}{3}\pi r^2[3h-2r]$

2. (C) 240 π cm^3

3. (A) 374 cm^2

4. (B) 471.42 m^2

5. (2.5 cm)

6. $\frac{16}{9}$

7. 51 min. 12 sec.

8. (90 cm)

9. (150)

10. 33.49 cm^3

PW Web/App- https://smart.link/7wwosivoicgd4
Library- https://smart.link/sdfez8ejd80if