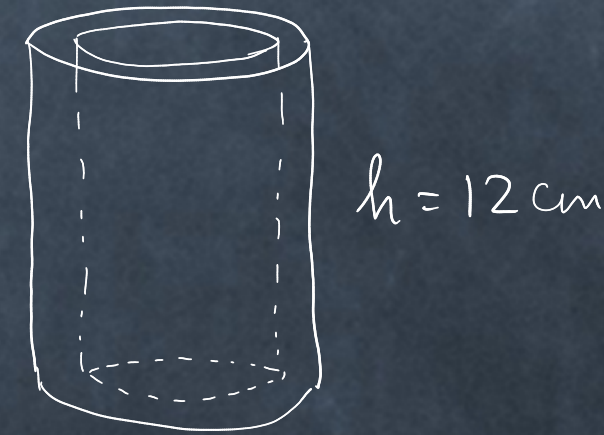
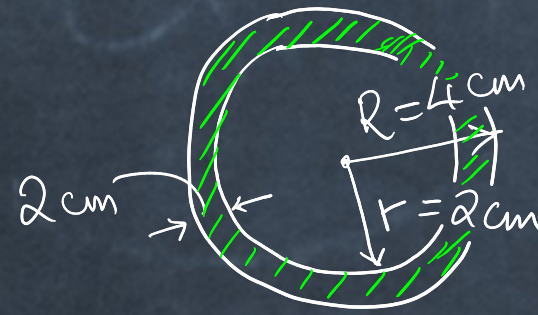


Q.9. Find the total surface area of a hollow cylinder open at both ends, if its length is 12 cm, external diameter is 8 cm and the thickness is 2 cm.



$$r = 2 \text{ cm}$$

$$R = 4 \text{ cm}$$

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

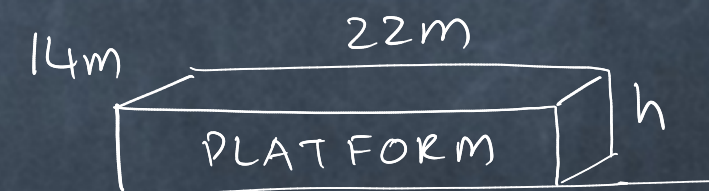
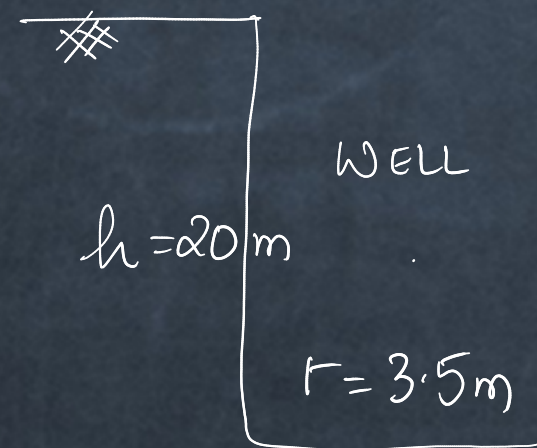
$$\begin{aligned} \text{TSA} &= \overbrace{2\pi R h + 2\pi r h}^{\text{Ext. Surface} + \text{Int. Surface}} + \underbrace{2\pi(R^2 - r^2)}_{\text{Top \& Bottom}} \end{aligned}$$

$$= 2\pi h(R + r) + 2\pi(R^2 - r^2)$$

$$= 2 \times 3.14 \times 12(4 + 2) + 2 \times 3.14(4^2 - 2^2)$$

$$\text{TSA} = 528 \text{ cm}^2$$

Q.13. A 20 m deep well with diameter 7 m is dug up and the earth from digging is spread evenly to form a platform 22 m $\times$ 14 m. Determine the height of the platform.



$$\begin{aligned}\text{Vol. of Earth dug from well} &= \pi r^2 h \\ &= \pi (3.5)^2 \times 20 \text{ m}^3\end{aligned}$$

$$\text{Vol. of Earth filled on platform} = (22 \times 14 \times h) \text{ m}^3$$

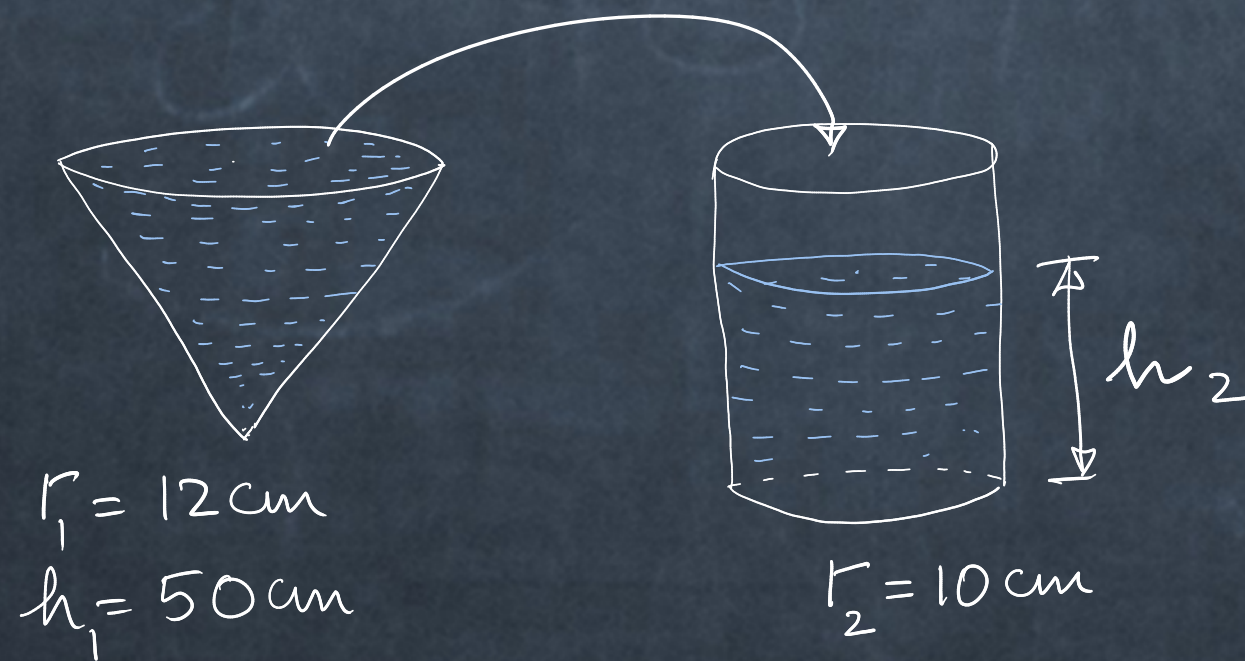
Equate both Volumes

$$\frac{22}{7} \times 3.5^2 \times 20 = 22 \times 14 \times h$$

$$h = 2.5 \text{ m}$$

$$\text{Height of platform} = 2.5 \text{ m}$$

Q. 15. A conical vessel, whose internal radius is 12 cm and height 50 cm, is full of liquid. The contents are emptied into a cylindrical vessel with internal radius 10 cm. Find the height to which the liquid rises in the cylindrical vessel.



Vol of water in Conical vessel = Vol of water in cylindrical vessel

$$\frac{1}{3} \pi (12^2 \times 50) = \pi (10)^2 h_2$$

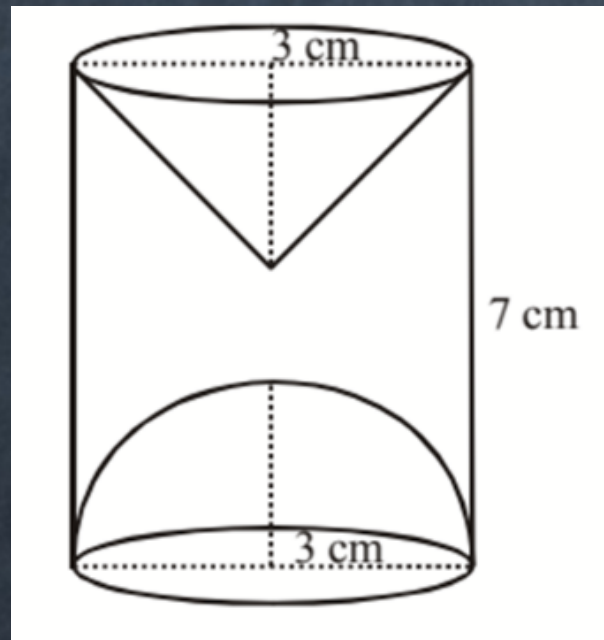
$$h_2 = \frac{4 \times 12^2 \times 50}{100} \Rightarrow h_2 = 24 \text{ cm}$$

$\therefore$ Height to which water rises in cylindrical vessel = 24 cm

Q. 27. A hemispherical and a conical hole is scooped out of a solid wooden cylinder. Find the volume of the remaining solid where the measurements are as follows:

The height of the solid cylinder is 7 cm, radius of each of hemisphere, cone and cylinder is 3 cm. Height of cone is 3 cm.

Give your answer correct to the nearest whole number. Take $\pi = \frac{22}{7}$.



Cylinder

$$r_1 = 3 \text{ cm}$$

$$h_1 = 7 \text{ cm}$$

Cone

$$r_2 = 3 \text{ cm}$$

$$h_2 = 3 \text{ cm}$$

Hemisphere

$$r_3 = 3 \text{ cm}$$

Volume of remaining solid = Cylinder Volume - (Cone Volume + Hemisphere Vol)

$$\bullet \text{ Cylinder Volume} = \pi r_1^2 h_1 = \frac{22}{7} (3)^2 \times 7 = 198 \text{ cm}^3$$

$$\bullet \text{ Cone Volume} = \frac{1}{3} \pi r_2^2 h = \frac{1}{3} \times \frac{22}{7} \times 3^2 \times 3 = 28.29 \text{ cm}^3$$

$$\bullet \text{ Hemisphere Vol} = \frac{2}{3} \pi r_3^3 = \frac{2}{3} \times \frac{22}{7} \times (3)^3 = 56.57 \text{ cm}^3$$

$$\text{Vol. of remaining solid} = 198 - (28.29 + 56.57) = 113.14 \text{ cm}^3$$