SELF ASSESSMENT TEST SOLUTIONS

1. $$\pi r l = 2\pi rh$$

$$\frac{l}{h} = 2$$

So (a) is the correct option.

2. Here edge of cube, $a = \frac{20}{4}$ cm = 5 cm

So surface area $6a^2 = 6 \times 5^2 \text{ cm}^2 = 150 \text{ cm}^2$

So (b) is the correct option.

3. Radius of the well $= \frac{7}{2}$ m = 3.5m

Volume of the earth dug out $= \frac{22}{7} \times (3.5)^2 \times 20$

$= \frac{22}{7} \times 3.5 \times 3.5 \times 20 = 770 \text{ m}^3$

Area of platform $= (22 \times 14)\text{m}^2 = 308\text{m}^2$

Height $= \frac{770}{308} = 2.5$m

So (a) is the correct option.

4. Volume of the remaining solid

= Volume of the cylinder - Volume of the cone

$= \pi \times 6^2 \times 10 - \frac{1}{3} \times \pi \times 6^2 \times 10$

$= (360\pi - 120\pi) = 240\pi \text{ cm}^3$

So (a) is the correct option.

5. $$\frac{V_1}{V_2} = \frac{64}{27}$$

$$\frac{4/3\ \pi r_1^3}{4/3\ \pi r_2^3} = \frac{64}{27}$$

$$\frac{r_1^3}{r_2^3} = \frac{64}{27}$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{4}{3}$$

Now, ratio of their surface areas $= \frac{4\pi r_1^2}{4\pi r_2^2} = \frac{r_1^2}{r_2^2} = \left(\frac{r_1}{r_2}\right)^2 = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$

So (d) is the correct option.

6. Here diameter of sphere = Radius of hemisphere = 6 cm

Radius of sphere = 3 cm

Volume, V $= \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times 3^3 \text{ cm}^3 = 113.14 \text{ cm}^3.$

7. Here diameter of hemisphere is equal to the side of cubical block which is 7 cm.

Diameter of hemisphere = Side of cubical block

$2r = 7 \Rightarrow r = \frac{7}{2}$

Surface area of solid = Surface area of the cube - Area of base of hemisphere + curved surface area of hemisphere

$= 6a^2 - \pi r^2 + 2\pi r^2 = 6l^2 + \pi r^2$

$= 6 \text{ x } 7^2 + \frac{22}{7} \times \left(\frac{7}{2}\right)^2$

$= 6 \times 49 + \frac{77}{2} = 332.5 \text{ m}^2$

8. Given, r = 7 m and h = 24 m

Slant height of tent, $l = \sqrt{r^2 + h^2} = \sqrt{7^2 + 24^2} = \sqrt{625} = 25$ m

CSA of cone, $\pi r l = \frac{22}{7} \times 7 \times 25 = 550\text{m}^2$

Let x meter of cloth is required then, $5x = 550 \Rightarrow x = \frac{550}{5} = 110$ m.

So 110 m of cloth is required.

$\therefore$ Cost of cloth $= 25 \times 110 =$ Rs.2750.

9. Let h be the rainfall.

Volume of water collected in cylindrical vessel,

$\frac{4}{5}\pi r^2 h = \frac{4}{5} \times \pi \times (1)^3 \times \left(\frac{7}{2}\right) = \frac{44}{5} \text{ m}^3$

Volume of rain water from roof $= 22 \times 20 \times h \text{ m}^3$.

Now $22 \times 20 \times h = \frac{44}{5}$

$h = \frac{44}{5} \times \frac{1}{22 \times 20} = \frac{1}{50}$ m.

$= \frac{1}{50} \times 100 = 2$ cm

10. Radius of earth dug out, $r = \frac{4}{2} = 2\text{m}$

Depth of the earth, h = 21,

Volume of earth, $\pi r^2 h = \frac{22}{7} \times (2)^2 \times 21$

$= 22 \times 4 \times 3 = 264\text{m}^3.$

Width of embankment = 3 m

Outer radius of ring = 2 + 3 = 5 m

Let the height of embankment be h.

ATQ, Volume of embankment = Volume of earth

$$\pi(R^2 - r^2)h = 264$$

$$\frac{22}{7} \times (5^2 - 2^2) \times h = 264$$

$$\frac{22}{7} \times (25 - 4) \times h = 264$$

$$\frac{22}{7} \times 21 \times h = 264$$

$$\Rightarrow \quad h = \frac{264 \times 7}{22 \times 21} = 4$$

ie. the height of embankment is 4 m.

11. Volume of hemispherical tank, $V = \frac{2}{3}\pi r^3 = \frac{2}{3}\pi\left(\frac{3}{2}\right)^3 m^3$

$$= \frac{2}{3} \times \frac{22}{7} \times \frac{27}{8} \ m^3 = \frac{99}{14} \ m^3$$

$$V = \frac{99}{14} \times 1000 \text{ litre} \quad [1 \ m^3 = 1000 \text{ litre}]$$

Volume of half of the hemisphere = $\frac{1}{2} \times \frac{99}{14} \times 1000$ Litres

Let time taken for this volume to flow out be t . Then according to question,

$$3\frac{4}{7}t = \frac{1}{2} \times \frac{99}{14} \times 1000$$

$$\frac{25t}{7} = \frac{1}{2} \times \frac{99}{14} \times 1000$$

$$t = \frac{7}{25} \times \frac{1}{2} \times \frac{99}{14} \times 1000$$

= 990 sec = 16 minutes 30 sec.

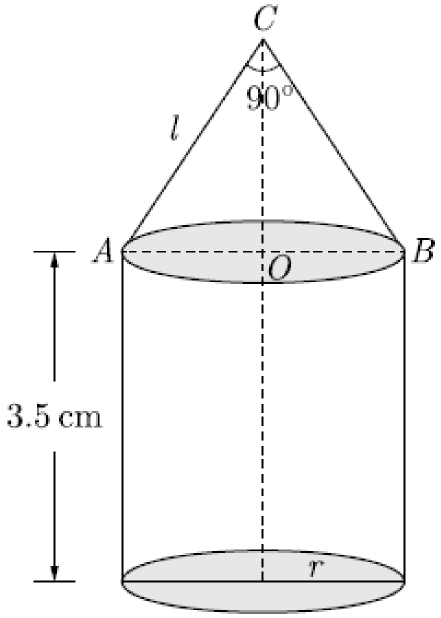
12. Volume of coin = $\pi(0.75)^2 \times 0.2 \ cm^3$

Volume of cylinder = $\pi(2.25)^2 \times 10 \ cm^3$

$$\text{No. of coins} = \frac{\text{Volume of cylinder}}{\text{Volume of coin}}$$

$$= \frac{\pi(2.25)^2 \times 10}{\pi(0.75)^2 \times 0.2} = \frac{(3)^2 \times 10}{0.2} = 450$$

13.



Given, $\angle C = 90°$, $r = \sqrt{2}$ m and AC = BC = l

$\therefore \quad AB^2 = AC^2 + BC^2$

$= l^2 + l^2 = 2l^2$

Now $\quad (2\sqrt{2})^2 = 2l^2$

$\Rightarrow \quad l = 2$ cm

Total surface area of toy= $2\pi rh + \pi r^2 + \pi rl = \pi r\,[7 + \sqrt{2} + 2]$ cm^2

$= \pi\sqrt{2}\,[9 + \sqrt{2}]$ cm^2

$= \pi\,[2 + 9\sqrt{2}]$ cm^2

14. $$\frac{\text{Volume of 1}^{st}\text{ sphere}}{\text{Volume of 2}^{nd}\text{ sphere}} = \frac{\frac{4}{3}\pi r^3}{\frac{4}{3}\pi R^3} = \frac{8}{27}$$

$$\frac{r^3}{R^3} = \frac{8}{27}$$

$$\frac{r}{R} = \frac{2}{3}$$

$$\frac{r}{R - r} = \frac{2}{3 - 2} = \frac{2}{1}$$

$$\frac{R - r}{r} = \frac{1}{2}$$

15. Let r be the internal radius of the pipe.

Speed of water flowing through the pipe

$= 2.52$ km/hr $= 2520$ m/hr

In an hour length of water = 2520 m

Volume of water flowing from pipe in 1 hr = $\pi r^2 h = \pi r^2 \times 2520\ m^3$

In 0.5 hour,

Volume of water flown = Volume of water in tank

$$\pi r^2 \times 2520 \times 0.5 = \pi \times (0.4)^2 \times 3.15$$

$$1260 r^2 = 0.4 \times 0.4 \times 3.15$$

$$400 r^2 = 0.4 \times 0.4$$

$$20r = 0.4 \Rightarrow r = \frac{0.4}{20} = 0.02 \text{ m}$$

So the diameter of pipe is 4 cm.