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Sphere

Total Surface area of Sphere = $4\pi r^2$

Hemisphere

Total Surface area of Hemisphere = $3\pi r^2$

13.4

① Find the Surface area of a sphere of radius

(i) 10.5 cm

$$\Rightarrow \text{Total surface area} = 4\pi r^2 \\ = 4 \times \frac{22}{7} \times 10.5 \times 10.5$$

$$= 4 \times \frac{22}{7} \times \frac{105}{10} \times \frac{105}{10} \\ = 4 \times 22 \times 15 \times 10.5 \\ = 10 \times 10.5 \times 2$$

Sulkhā

$$= \frac{2 \times 4 \times 22 \times 3 \times 21}{7 \times 2}$$

$$= 2 \times 21 \times 3 \times 21$$

$$= 1386 \text{ cm}^2$$

$$= 1386 \text{ cm}^2$$

② Find the surface area of a sphere of diameter

→

② 5.6 cm

$$\text{Total surface area} = 4\pi r^2$$

$$= 4 \times \frac{22}{7} \times 5.6 \times 5.6$$

$$= 4 \times \frac{22}{7} \times \frac{56}{10} \times \frac{56}{10}$$

$$= \frac{4 \times 22 \times 4 \times 28}{5 \times 5}$$

$$= \frac{4 \times 22 \times 4 \times 28}{25}$$

$$= \frac{88 \times 32}{25}$$

$$= \frac{2816}{25} = 112.24 \text{ cm}^2$$



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Q. 11
→

14 cm

Total Surface Area = $4\pi r^2$

$$= \frac{4 \times 22 \times 14^2 \times 14}{7}$$

$$= 4 \times 22 \times 2 \times 14$$

$$= 88 \times 28$$

$$= 2464 \text{ cm}^2$$

Q. 12 Find the surface area of a sphere of diameter.

→ (i) 14 cm

→ $r = 7 \text{ cm}$

Total Surface area of Sphere = $4\pi r^2$

$$= \frac{4 \times 22 \times 7 \times 7}{7}$$

$$= 4 \times 22 \times 7$$

$$= 616 \text{ cm}^2$$

Q. 13
→

21 cm

$$r = \frac{21}{2} = 10.5 \text{ cm}$$

Total surface area of Sphere = $4\pi r^2$

$$= 4 \times 22 \times 10.5 \times 10.5$$

Sulochana

$$\frac{4 \times 22 \times 105}{71} \times \frac{105}{102} \times \frac{21}{102}$$

$$= \frac{2 \times 11 \times 22 \times 3 \times 21}{2 \times 21}$$

$$= 2 \times 11 \times 3 \times 21$$

$$= 42 \times 33$$

$$= 1386 \text{ cm}^2$$

(18)

$$3.5 \text{ m}$$

=

$$r = \frac{3.5}{2}$$

$$\begin{aligned} \text{Total Surface Area} &= 4\pi r^2 \\ &= \frac{4 \times 22 \times 3.5 \times 3.5}{7} \\ &= \frac{4 \times 11 \times 35 \times 3.5}{7 \times 10} \\ &= \frac{2 \times 11 \times 5 \times 35}{10 \times 21} \\ &= \frac{2 \times 11 \times 5 \times 35}{10 \times 10} \\ &= \frac{12 \times 11 \times 5 \times 35}{100} \\ &= 50 \end{aligned}$$



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$$= \frac{11 \times 5 \times 35}{2} \times 7$$
$$= \frac{50}{10} \times 7$$

$$= \frac{11 \times 7}{2}$$
$$= \frac{77}{2}$$

$$= 38.5 \text{ cm}^2$$

③ Find the total surface area of a hemisphere of radius 10 cm ($\pi = 3.14$)

$$r = 10 \text{ cm}$$

$$\pi = 3.14$$

Total surface area of hemisphere

$$= 3\pi r^2$$

$$= 3 \times 3.14 \times 10 \times 10$$

$$= 9.42 \times 100$$

$$= 942 \text{ cm}^2$$

④ The radius of a spherical balloon increases from 7 cm to 14 cm as air being pumped into it. Find the ratio of surface

Areas of the balloon in the two cases.

= When $r = 7$ cm

$$\text{Surface area} = 4\pi r^2$$
$$= 4 \times \frac{22}{7} \times 7 \times 7$$

$$= 4 \times 22 \times 7$$

When $R = 14$ cm

$$\text{Surface area} = 4\pi R^2$$
$$= 4 \times \frac{22}{7} \times 14 \times 14$$

$$= 4 \times 22 \times 14$$

Required ratio of the surface areas of the balloon.

$$= \frac{4 \times 22 \times 7}{4 \times 22 \times 14} = \frac{4}{8}$$

$$\frac{S_1}{S_2} = \frac{(7)^2}{(14)^2} = \frac{7 \times 7}{14 \times 14} = \frac{1}{4}$$

Ratio is 1:4



- ⑤ A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin-plating it on the inside at the rate of ₹16 per 100 cm².

$$\rightarrow d = 10.5 \text{ cm} \quad r = \frac{10.5}{2} = \frac{105}{20}$$

$$\text{Inner area} = 2\pi r^2$$

$$= 2 \times \frac{22}{7} \times \frac{105}{20} \times \frac{105}{20}$$

$$= \frac{2 \times 22 \times 15 \times 105}{10 \times 10}$$

$$= \frac{11 \times 15 \times 105}{100}$$

$$= \frac{17325}{100}$$

$$= 173.25 \text{ cm}^2$$

Rate of tin plating is

For 100 cm² = ₹16

For 1 cm² = $\frac{16}{100}$

$$\text{Cost for } 173.25 \text{ cm}^2 = \frac{173.25 \times 100}{100}$$

$$= \frac{2772.00}{100}$$

$$= 27.72$$

$$= \frac{2772}{100}$$

$$= 27.72$$

(7) The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas.

→ Let diameter of moon = d_m
Let diameter of earth = d_e

Radius of moon = r_m

Radius of earth = r_e

Given $\frac{d_m}{d_e} = \frac{1}{4}$

$$2r_m = \frac{1}{4} \times 2r_e$$



$$\frac{2 \times m}{1} = \frac{\rho}{9}$$

$$r_e \times 1 = 2 \times 20m$$

$$[r_e = 40m] \rightarrow (1)$$

$$S_m = 4\pi r_m^2$$

$$S_e = 4\pi r_e^2$$

$$\frac{S_m}{S_e} = \frac{4\pi r_m^2}{4\pi r_e^2}$$

$$\frac{S_m}{S_e} = \frac{r_m^2}{r_e^2}$$

$$\frac{S_m}{S_e} = \frac{r_m^2}{(40m)^2} [r_e = 40m]$$

$$= \frac{10m^2}{1600m^2} = \frac{1}{16} = 1:16$$

⑧ A hemispherical bowl is made of steel 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

→ Inner radius (r) = 5 cm

Thickness = 0.25 cm

Outer Radius = $5 + 0.25$
 $= 5.25$

CSA = $2\pi r^2$
 $= 2 \times \frac{22}{7} \times 5.25 \times 5.25$

$= 2 \times \frac{22}{7} \times \frac{75}{100} \times \frac{525}{100}$

$= \frac{2 \times 22 \times 75 \times 525}{100 \times 100}$

$= \frac{11 \times 75 \times 525}{50 \times 50}$

$= \frac{11 \times 15^3 \times 105}{10 \times 10}$

$= \frac{11 \times 3 \times 21}{2 \times 2}$

346.5

173.25

~~693~~

= ~~346.5~~

42

21

= 173.25 cm²

- 38.8 F
- (a) A right circular cylinder just encloses a sphere of radius x . Find
- Surface area of the sphere.
 - Curved surface area of the cylinder.
 - Ratio of the areas obtained in (i) and (ii)

→ Radius of the sphere = x
 Radius of the cylinder = x

(i) Surface area of sphere = $4\pi x^2$

(ii) Curved surface area of cylinder = $2\pi xh$
 $= 2\pi x \times x \times 2x = 4\pi x^2$

(iii) Ratio = $\frac{4\pi x^2}{4\pi x^2} = 1$