Exercise 21.1

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Question 1: Find the surface area of a sphere of radius:
(i) 10.5 cm (ii) 5.6 cm (iii) 14 cm

Solution:
Surface area of a sphere = $4\pi r^2$

Where, r = radius of a sphere

(i) Radius = 10.5 cm

Surface area = $4 \times 22/7 \times (10.5)^2$

= 1386

Surface area is 1386 cm^2

(ii) Radius= 5.6 cm

Surface area = $4\times22/7\times(5.6)^2$

= 394.24

Surface area is 394.24 cm^2

(iii) Radius = 14 cm

Surface area = $4\times22/7\times(14)^2$

= 2464

Surface area is 2464 cm^2

Question 2: Find the surface area of a sphere of diameter:
(i) 14 cm (ii) 21 cm (iii) 3.5 cm

Solution:
Surface area of a sphere = $4\pi r^2$

Where, r = radius of a sphere

(i) Diameter= 14 cm

So, Radius = Diameter/2 = 14/2 cm = 7 cm

Surface area = $4\times22/7\times(7)^2$

= 616

Surface area is 616 cm^2

(ii) Diameter = 21cm

So, Radius = Diameter/2 = 21/2 cm = 10.5 cm

Surface area= $4\times22/7\times(10.5)^2$

= 1386

Surface area is 1386 cm^2

(iii) Diameter= 3.5cm

So, Radius = Diameter/2 = 3.5/2 cm = 1.75 cm

Surface area = $4\times22/7\times(1.75)^2$

= 38.5

Surface area is 38.5 cm^2

Question 3: Find the total surface area of a hemisphere and a solid hemisphere each of radius 10 cm. (π=3.14)

Solution:
Radius of a hemisphere = Radius of a solid hemisphere = 10 cm (Given)

Surface area of the hemisphere = $2\pi r^2$

= $2\times3.14\times(10)^2$ cm^2

= 628 cm^2

And, surface area of solid hemisphere = $3\pi r^2$

$= 3\times3.14\times(10)^2$ cm^2

$= 942$ cm^2

Question 4: The surface area of a sphere is 5544 cm^2, find its diameter.

Solution:

Surface area of a sphere is 5544 cm^2

Surface area of a sphere = $4\pi r^2$

So, $4\pi r^2 = 5544$

$4\times22/7\times(r)^2 = 5544$

$r^2 = (5544 \times 7)/88$

$r^2 = 441$

or r = 21cm

Now, Diameter=2(radius) = 2(21) = 42cm

Question 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 Rs.4 per 100 cm^2.

Solution:

Inner diameter of hemispherical bowl = 10.5 cm

So, radius = Diameter/2 = 10.5/2 cm = 5.25 cm

Now, Surface area of hemispherical bowl = $2\pi r^2$

$= 2 \times 3.14 \times (5.25)^2$

$= 173.25$

So, Surface area of hemispherical bowl is 173.25 cm^2

Find the cost:
Cost of tin plating 100 cm^2 area= Rs.4 (given)

Cost of tin plating 173.25cm^2 area = Rs. 4×173.25100 = Rs. 6.93

Therefore, cost of tin plating the inner side of hemispherical bowl is Rs.6.93.

Question 6: The dome of a building is in the form of a hemisphere. Its radius is 63 dm. Find the cost of painting it at the rate of Rs. 2 per sq m.

Solution:

Radius of hemispherical dome = 63 dm or 6.3 m

Inner surface area of dome = $2\pi r^2$

$=2\times3.14\times(6.3)^2$

= 249.48

So, Inner surface area of dome is 249.48 m^2

Now find the cost:

Cost of painting 1m^2 = Rs.2 (given)

Therefore, cost of painting 249.48 m^2= Rs. (249.48×2) = Rs.498.96.