9. SURFACE AREA AND VOLUME

Q.1. Perimeter of one surface of cube is 24 cm , then find

(i) Total surface area

(ii) volume of the cube

Solution:

Perimeter of one surface of cube = 24 cm

But, perimeter of one surface of cube = $4l$

$\therefore 4 \times l = 24$

$l = \frac{24}{4}$

$l = 6$ cm

∴length of the cube is 6 cm

(i) ∴ Total surface area of cube = $6l^2$

$= 6 \times 6^2$

$= 216\ cm^2$

(ii) ∴volume of cube = l^3

$= 6^3$

$= 216 cm^3$

∴ Total surface area of cube is 216 cm^2 and Volume of the cube is 216 cm^3

Q. 2. 1000 cm^3 is volume of a cube .find the total surface area of the cube.

Solution:

$(side)^3$ = volume of the cube

$\therefore\ l^3 = 1000\ cm^3$

$\therefore\ l = 10cm$

Total surface area of cube $= 6l^2$

$= 6 \times 10^2$

$= 6 \times 100$

$= 600cm^2$

Q.3 A plastic box 1.5 m long 1.25 m wide and 65 cm Deep is to be made .it is opened at the top ignoring the thickness of the plastic sheet determine.

(i)The area of the sheet required for making the box

(ii)The cost of sheet for it ,if a sheet measuring $1m^2$

Costs rs.20

Solution:

(i) Here l = 1.5 m b = 1.25 m

H = 65 cm $\frac{65}{100}$ = 0.65 m

∴ It is open from the top

∴ Its surface area = lateral surface area +base area

=[2(l + b) h] + (l × b)

=[2(1.50 + 1.25) 0.65] + (1.50 × 1.25)

=[2×2.75× 0.65] × [1.875]

= 3.575+1.875

= 5.45 m^2

Total surface area of the box = 5.45 m^2

∴ Area of sheet required for making the box = 5.45 m^2

(ii) Rate of sheet = Rs.20 per m^2

∴cost of 5.45 m^2 = rs.20 × 5.45

= rs.20 × $\frac{5.45}{100}$ = $Rs.109$

∴cost of required sheet = Rs.109.

Q.4. The floor of a rectangular hall has a perimeter 250 m if The cost of painting the four walls at the rate of rs.10

Per m^2 is rs 15,000, find the height of the wall.

Solution:

Area of four walls = lateral surface area a rectangular

Hall means a cuboid .

Let the length and breath of the hall be l and b respectively

∴perimeter of the floor = 2 (l +b)

= 250 m

∴ Area of four walls = lateral surface area

= [2 (l +b)] ×h (his height of hall)

∴cost of painting the four walls = rs.10 × 250 h

= rs.2500 h

Rs.2500 h = Rs. 15000 h

$$H = \frac{15000}{2500} = 6$$

∴ The required height of the hall = 6 m

Q.5. Curved surface area of cone is 4070 $cm^2$and the Diameter of base is 70 cm find slant height of the Cone.

Solution:

$$\text{Radius of the cone} = \frac{Diameter}{2}$$

$$= \frac{70}{2}$$

$$= 35 \text{ cm}$$

$$\text{Curved surface area of cone} = \pi r l$$

$$\therefore \pi r l = 4070$$

$$\therefore \frac{22}{7} \times 35 \times l = 4070$$

$$\therefore 22 \times 5 \times l = 4070$$

$$\therefore l = \frac{4070}{22 \times 5}$$

$$\therefore l = \frac{814}{22} = 37 \text{ cm}$$

Slant height of the cone is 37 cm