



Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q23

Answer :

It is given that

Length of the tank (l) = 80 m
= 8,000 cm

Breadth of the tank (b) = 25 m
= 2500 cm

Area of the cross section of the pipe is 25 cm^2

The water flows at the rate of 16 km/hr.

We are asked to find the level of tank raised in 45 minutes

In 45 minutes, the water through the pipe will go,

$$\begin{aligned} L &= (45 \text{ min}) \times \frac{16 \text{ km}}{60 \text{ min}} \\ &= 12 \text{ km} \\ &= 12000 \text{ m} \end{aligned}$$

Area of the cross-section of the pipe is 25 cm^2 .

So, the quantity of the water poured in 45 minutes,

$$\begin{aligned} V &= 25 \text{ cm}^2 \times L \\ &= 25 \text{ cm}^2 \times 12000 \text{ m} \\ &= 25 \text{ cm}^2 \times 12,00,000 \text{ cm} \\ &= 3,00,00,000 \text{ cm}^3 \end{aligned}$$

Let,

$h \rightarrow$ Height to which the water is raised

So,

$$V = lbh$$

$$3,00,00,000 = 8,000 \times 2500 \times h$$

$$h = \frac{3,00,00,000}{8,000 \times 2500}$$
$$= \frac{300}{8 \times 25}$$

$$= 1.5 \text{ cm}$$

In 45 minutes, the water level rises by 1.5 cm

Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q24

Answer :

Dimensions of the reservoir are,

$$\text{Length}(l) = 80 \text{ m}$$

$$\text{Breadth}(b) = 60 \text{ m}$$

$$\text{Depth}(h) = 6.5 \text{ m}$$

Side of the cross-section of the pipe = 20 cm

$$= 0.2 \text{ m}$$

The flow of water through the water is;

$$v = 15 \text{ km/hr}$$

$$= 15000 \text{ m/hr}$$

We are asked to find the time in which the reservoir can be emptied

Here, volume of the water in the reservoir,

$$V = lbh$$

$$= (80 \times 60 \times 6.5) \text{ m}^3$$

Since the side of the cross-section of the pipe = 20 cm

$$= 0.2 \text{ m}$$

So, the area of the cross-section of the pipe,

$$(0.2)^2$$

$$= 0.04 \text{ m}^2$$

Velocity of the water,

$$\begin{aligned}v &= 15 \text{ km/hr} \\ &= 15000 \text{ m/hr}\end{aligned}$$

Let,

$t \rightarrow$ Time required emptying the reservoir

So,

$$V = A \times v \times t$$

$$\begin{aligned}t &= \frac{V}{A \times v} \\ &= \frac{80 \times 60 \times 6.5}{0.04 \times 15000} \\ &= \frac{80 \times 60 \times 6.5}{600} \\ &= 52 \text{ hrs}\end{aligned}$$

Using that pipe, the water is emptied in 52 hrs .

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