

Mensuration

Max Marks(2+7x4=30)

Q1) The radius and height of a cylinder are in ratio 5:7 and its volume is $4400m^3$. Find its radius.

Q2)The dimensions of a cuboid are in ratio 4:2:5. Its volume is 29,160 cu m. Find its surface area.

Q3) The length of a hall is 18m and width is 13.5m. Find the least number of square tiles each of side 25cm, required to cover the floor of the hall.

i) without leaving the margin .

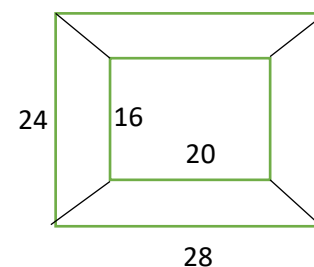
ii) leaving the margin of 1.5m all around. .

Q4) A wire, when bent in the form of a square, encloses an area of $196cm^2$. If the same wire is bent to form a circle find the area of the circle.

Q5) The Diameter of the road roller is 1.4m and it is 2m long. Find the area of road covered in 45 revolutions. Find the cost of construction if rate is ₹110per m^2

Q6) Area of a rhombus is $96cm^2$ whose one diagonal is 16cm. Find its height.

Q7)Find the area of each section of a frame as shown in the figure, if width of each section is equal.



Q8)A metal cube of side 11cm is completely submerged in water contained in a cylindrical vessel with the diameter 28cm. Find the rise in the level of water.

Answer Key

Q1) The radius and height of a cylinder are in ratio 5:7 and its volume is $4400m^3$. Find its radius.

Sol) Let radius = $5x$ and Height = $7x$

Now Volume = $\pi r^2 h$

$$i. e. 4400 = \frac{22}{7} \times 5x \times 5x \times 7x$$

$$4400 = 22 \times 25x^3$$

$$x^3 = \frac{4400}{22 \times 25} = 8$$

$$x = 2$$

$$radius = 10m$$

Q2) The dimensions of a cuboid are in ratio 4:2:5. Its volume is 29,160 cu m. Find its surface area.

Sol)

Let $L = 4x, B = 2x$ and $H = 5x$

now, volume = $LBH = 29160 = 4x \times 2x \times 5x = 40x^3$

$$x^3 = 729$$

$$x = 9$$

Now, $TSH = 2(lb + bh + lh)$

$$= 2(4x \times 2x + 2x \times 5x + 4x \times 5x)$$

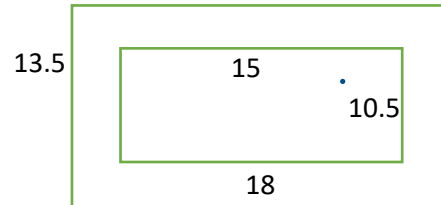
$$= 2(38x^2) = 76x^2$$

$$= 76 \times 81 = 6156m^2$$

Q3) The length of a hall is 18m and width is 13.5m. Find the least number of square tiles each of side 25cm, required to cover the floor of the hall.

i) without leaving the margin .

ii) leaving the margin of 1.5m all around.



Sol) Area of hall = $18 \times 13.5 = 243m^2$

Area of one tile = $25 \times 25 = 625cm^2 = 0.0625m^2$

Area of hall after leaving margins = $15 \times 10.5 = 157.5m^2$

i) Number of tiles required without margin = $\frac{243}{0.0625} = 3888$

ii) Number of tiles required with margin = $\frac{157.5}{0.0625} = 2520$

Q4) A wire, when bent in the form of a square, encloses an area of $196cm^2$. If the same wire is bent to form a circle find the area of the circle.

Sol) Area of square = $196cm^2$, Side = 14cm

Perimeter = $4s = 4 \times 14 = 56cm$

\therefore length of wire = $56cm =$ circumference of circle

$$2\pi r = 56, r = \frac{56}{2\pi}$$

$$\text{Area of circle} = \pi r^2 = \pi \times \frac{56}{2\pi} \times \frac{56}{2\pi} = \frac{56 \times 56}{4\pi}$$

$$= \frac{56 \times 56 \times 7}{4 \times 22} = 249.45cm^2$$

Q5) The Diameter of the road roller is 1.4m and it is 2m long. Find the area of road covered in 45 revolutions. Find the cost of construction if rate is ₹110 per m^2

Sol)

Area covered in one revolution = circumference of road roller x length of Road roller

$$\text{Circumference of road roller} = 2 \times \frac{22}{7} \times 0.7 = 4.4\text{m}$$

$$\text{Area covered in one revolution} = 4.4 \times 2 = 8.8\text{m}^2$$

$$\text{Area of road covered in 45 revolutions} = 8.8 \times 45 = 39.6\text{m}^2$$

$$\text{cost of construction} = 110 \times 39.6 = ₹4356$$

Q6) Area of a rhombus is 96cm^2 whose one diagonal is 16cm. Find its height.

$$\text{Sol) Area of Rhombus} = \frac{1}{2} d_1 \times d_2 \Rightarrow$$

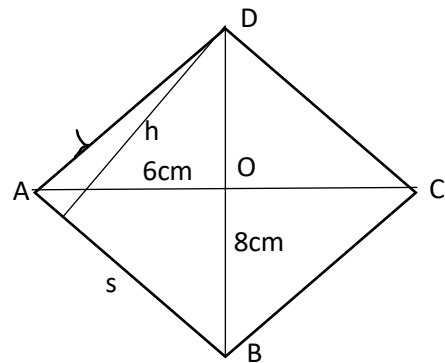
$$\frac{16}{2} \times d_2 = 96,$$

$$d_2 = 12\text{cm}, AO = 6\text{cm and } BO = 8\text{cm}$$

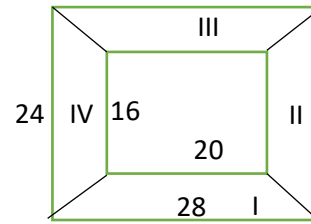
By Pythagoras theorem, $AB = 10\text{cm}$

Now area of rhombus is $b \times h$, where $b = AB = 10$ & area = 96cm^2

$$h = \frac{96}{10} = 9.6\text{cm}$$



Q7) Find the area of each section of a frame as shown in the figure, if width of each section is equal.



$$\text{Sol) Area of Trapezium} = \frac{1}{2}h(p_1 + p_2)$$

$$\text{Height of Trapezium} = \text{Width} = (28-20)/2 = 4 \text{ units}$$

$$\text{Area of Section (Trapezium) 1} = \frac{1}{2} \times h \times (p_1 + p_2) = \frac{1}{2} \times 4(20 + 28) = 96 \text{ sq unit}$$

$$\text{Area of Section (Trapezium) 2} = \frac{1}{2} \times h \times (p_1 + p_2) = \frac{1}{2} \times 4(24 + 16) = 80 \text{ sq unit}$$

$$\text{Area of Section (Trapezium) 3} = \frac{1}{2} \times h \times (p_1 + p_2) = \frac{1}{2} \times 4(20 + 28) = 96 \text{ sq unit}$$

$$\text{Area of Section (Trapezium) 4} = \frac{1}{2} \times h \times (p_1 + p_2) = \frac{1}{2} \times 4(24 + 16) = 80 \text{ sq unit}$$

Q8) A metal cube of side 11cm is completely submerged in water contained in a cylindrical vessel with the diameter 28cm. Find the rise in the level of water.

$$\text{Sol) Volume of cube} = 11 \times 11 \times 11 = 1331 \text{ cm}^3$$

Volume of part of cylinder which rise because of
Submerging the cuboid = volume of cuboid.

$$\text{Volume of part of cylinder} = 1331$$

$$\pi r^2 h = \frac{22}{7} \times 14 \times 14 \times h = 1331$$

$$h = \frac{1331 \times 7}{22 \times 14 \times 14} = 2.1606 \text{ cm}$$

