7. Mensuration

Q. 1 A) MCQ - (1 Mark Each)

1) If the dimensions of a cuboid in cm are 16 × 14 × 20, then its total surface area is.....

A) 4480 cm^2 B) 1648 cm^2

C) 824 cm^2 D) 1740 cm^2

2) The total surface area of hemisphere is 300 π cm^2 , then find its radius.

A) 8 cm B) 12 cm

C) 10 cm D) 9 cm

3) Find the perimeter of a sector of a circle if its measure is 90^o and radius is 7 cm.

A) 25 cm B) 44 cm

C) 36 cm D) 56 cm

4) The radius of a cone is 7 cm and height is 24 cm. What is its curred surface area?

A) 550 cm^2 B) 110 cm^2

C) 440 cm^2 D) 330 cm^2

5) For a cuboid $l^2 + b^2 + h^2 = 484$ cm^2 then what is the length of its diagonal?

A) 12 cm B) 22 cm

C) 11 cm D) 24 cm

6) If the radius of the sector is 6 and length of its corresponding are is 14, then area of the sector is..... .

A) 35 B) 84

C) 42 D) 24

7) Find the ratio of the volumes of a cylinder and cone having equal radius and equal height.

A) 1 : 3 B) 3 : 1

C) 2 : 1 D) 1 : 2

8) The height of cone is 12 cm and radius is 5 cm then its slant height .....

A) 17 cm B) 60 cm

C) 7 cm D) 13 cm

9) What is volume of the bath tub in litres if its volume in cm^3 is 2058?

A) 2058 B) 20.58

C) 2.058 D) 205.8

10) A solid sphere of diameter 6 cm is melted and drawn into a wire of radius 4 mm. The length of wire is .....

A) 90^0 cm B) 90 cm

C) 900 m D) 225 cm

Q. 1 B) **1)** Find the area of the segment of a circle of radius 7 cm whose corresponding sector has a central angle of 60^0 (π =3.14)

2) Area of a sector of a circle of radius 15 cm is 30 cm^2. Find the length of the arc of the sector.

3) Radius of sector of a circle is 5 cm and length of its arc is 2.8 cm. Find the area of the sector.

4) Find the surface area of sphere of radius 4.2 cm.

5) The radii of circular ends of frustum of a cone are 20 cm and 12 cm and its height is 6 cm. Find the Slant height of frustum.

Q. 2 A) 1) If the heights of two cylinders are equal and their radii are in the ratio of 7 : 5 then the ratio of their volumes is.....

Volume of cylinder = $\square$ ..... (Formula)

$= h_2$

$$\frac{\square}{r_2} = \frac{7}{\square}$$

$$\frac{\pi r^2 h_1}{\pi r^2 h_2} = \frac{49}{25}$$

2) A road roller of length $3l$m and radius $\frac{l}{3}$m can cover field in 100 revolutions moving once over. The area of the field in terms of l ..... m^2

Curved surface area = $2\pi rh$

$h = \square$ m

$\square = \frac{l}{3}$ m

$\therefore$ Curved surface area of cylinder = $\square \times 2$

$\therefore$ Area of field = $2\pi r l^2 \times 100 = \square$

3) Find the volume of greatest right circular cone, which can be cut from a cube of a side 4 cm.

Let, diameter of cone be edge of the square

$\therefore\ l = \square$ cm

$\therefore\ h = \square$ 4 cm

$r =$ 2 cm

Volume of cone = $\square$ ..... (Formula)

$V = \frac{1}{3}\ \pi\ \square^3 \times 4$

V = ☐ cm^3

4) The measure of central angle of circle is 150^0 and the radius of circle is 21 cm. To find the length of the arc complete the following activity.

Length of arc = l = $\frac{\theta}{360}$ × ☐

= $\frac{150^\circ}{\square}$ × ☐ × $\frac{22}{7}$ × 2 = ☐ cm

5) A right circular cone in such that the angle of at its vertex is 90º and its base radius is 49 cm. then find the curved surface area of the cone?

Let slant height be x and ⊥ will bisect vertex angle.

∴ △ ABC is isoright angle △

∴ $x^2 + x^2 = (49 \times 2)^2$

$x^2 = 4802$

Curved surface area of cone = ☐ ... (formula)

= $\frac{22}{7}$ × 49 × ☐

= $\frac{22}{7}$ × ☐ × $49\sqrt{2}$

= ☐ cm^2

Q. 2 B) Solve the following questions. (2 Marks Each)

1) The diameter of a garden roller is 1.4 m and it is 2 m long. How much area will it is 2 m long. How much area will it cover in 5 revolutions. $\left(\pi = \frac{22}{7}\right)$

2) Find the surface area of a sphere of radius 3.5 cm.

3) The volume of a cube is 1000 cm^3. Find its total surface area.

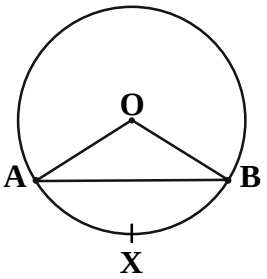
4) A cone of height 24 cm has a plane base of surface area 154 cm^2. Find its volume.

5) Find the surface area of hemisphere with radius 10 cm (π = 3.14)

6) In figure, point O is the centre of the circle.

∠AOB = 30º, OA = 12 cm.

Find the area of segment AXB (π = 3.14)



Q. 3 A) 1) The circumferences of circular faces of frustum are 132 cm and 88 cm and its height is 24 cm, to find the curved surface area of the frustum complete the following activity. $\left(\pi = \frac{22}{7}\right)$

$$\text{Circumference}_1 = 2\pi r_1 = 132$$

$$r_1 = \frac{132}{2\pi} = \square$$

$$\text{Circumference}_2 = 2 = 2\pi r_2 = 88$$

$$r_2 = \frac{88}{2\pi} = \square$$

$$\text{Slant height frustum} = (l) = \sqrt{h^2 + (r_1 - r_2)^2}$$

$$= \sqrt{\square^2 + \square^2}$$

$$= \square \text{ cm}$$

$\therefore$ curved surface area of frustum $= \pi (r_1 + r_2)\, l = \square$ cm^2

2) The circumference of circular faces of a frustum.

3) The area of a minor sector of a circle is 3.85 cm^2. The measure of its central angle is 36°. Find the radius of circle.

Area of minor sector = 3.85 cm^2

Measure of its central angle (θ) = 150°

let, its radius be r

$$\text{Area of minor sector} = \frac{\theta}{150^\circ} \times \square$$

$$3.85 = \frac{36^\circ}{360^\circ} \times \frac{22}{7} \times r^2$$

$$r^2 = \frac{\square \times \square \times \square}{\square}$$

$$r^2 = 12.25$$

$$r = \square$$

4) A hollow hemisphere bowl of thickness 1 cm has an inner radius of 6 cm. Find the volume of metal required to make the bowl.

Inner Radius r = 6 cm

Thickness, t = 1 cm

$\therefore$ Outer Radius (R) = 6 + 1 = 7 cm

$\therefore$ Volume of steel required $= \frac{2}{3}\pi r^3 - \frac{2}{3}\pi r^3$

$$= \frac{2}{3} \times \frac{22}{7} \times \square^3 - \frac{2}{3} \times \frac{22}{7} \times \square^3$$

$$= \frac{44}{21}(\square - 6^3)$$

$= \frac{44}{21} \times (\square - \square)$

$= \frac{44}{21} \times \square$

$= \frac{5588}{21}\ cm^2$

4) In the figure given below, ABCD is a square of side 7 cm. BD is an arc of a circle of radius AB. What is the area of shaded region.

Area of shaded region = 2 (Area of sector BAD – Area of Δ ABD)

$= \left[\frac{90°}{396°} \times \square \times 7^2 - \square \times 7^2\right]$

$= 2\left[\frac{1}{4} \times 154 - \square\right]$

$= \frac{2}{2}[77 - \square]$

$= \square\ cm^2$

6) A square of side 28 cm is folded into a cylinder by joining its two sides. Find the base area of the cylinder thus formed.

Area of square = Total surface area of cylinder

$(28)^2 = 2\pi rh$

$= 2 \times 22 \times r \times 28$

$r = \frac{(28)^2 \times 7}{2 \times 22 \times \square}$

$r = \frac{\square}{11}$

Base area of cylindesr = πr^2

$= \frac{22}{7} \times \frac{49}{\square} \times \frac{\square}{11}$

$= \frac{\square}{\square}\ cm^2$

Q. 3 B) **1)** In a clock, the minute hand is of length 7 cm. Find the area covered by the minute hand in 5 minutes.

2) Three cubes each of side 15 cm joined end to end. Find the total surface area of the rusting cuboid**.**

3) The radii of the circular ends of a frustum of a cone are 14 cm and 8 cm If the height of the frustum is 8 cm find :

a) Slant height of frustum.

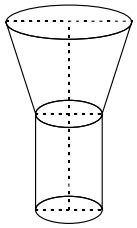
b) Total surface area of frustum.

c) Volume of frustum ($\pi = 3.14$)

4) A sector of a circle of radius 15 cm has the angle 120º. It is rolled up so that two bounding radii are joined together to form a cone. Find the volume of the cone. $\left(\pi = \frac{22}{7}\right)$

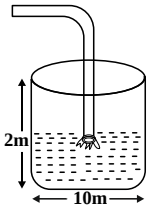
5) A metallic sphere of radius 10.5 cm is melted and then recast into small cones, each of radius 3.5 cm and height is 3 cm. Find how many cones are obtained?

Q. 4) **1)** An oil funnel made of tin sheet consists of a cylindrical portion 10 cm long attached to a frustum of a cone. If the total height is 22 cm, diameter of the cylindrical portion is 8 cm and the diameter of the top of funnel is 18 cm. Find the area of tin required to make the funnel.



2) A toy is in the form of a cone mounted on a hemisphere. The diameter of the base of the cone and that of a hemisphere is 18 cm and the height of cone is 12 cm. Find the total surface area of toy. ($\pi = 3.14$)

3) A farmer connects a pipe of internal diameter 20 cm from the canal into a cylindrical tank in his field, which is 10 m in diameter and 2 m deep. If water flows through the rate of 3 km/h, in how much time will the tank be filled.



4) How many coins 1.75 cm in diameter and 2 mm thick must be melted to form a cuboid
11 cm × 10 cm × 7 cm?

Q. 5. 1) Write True or False and justify your answers in the following.

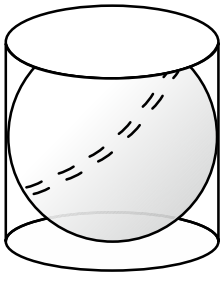
a) A solid ball is exactly fitted inside the cubical box of side b,

The volume of ball is $\frac{4}{3}\pi b^3$

b) The capacity of cylindrical vessel with a hemispherical portion raised upward at the bottom as shown in fig. is πr^3 (3h – 2r) where r is radius in c^3m and h cm is height.

2) In the figure, a sphere is placed in a cylinder. It touches the top, bottom and the curved surface of cylinder. If radius of the base of the cylinder is r. Write the answers of following questions.

a) What is the height of the cylinder in terms of r.



b) What is the ratio of curved surface area of cylinder and surface area of sphere.

c) What is the ratio volumes of the cylinder and of the sphere?

3) A horse is tied to a peg at one corner of square shaped grass field of side 15 m by means of 5 m long rope, find

a) The area of that part of the field in which the horse can graze.

b) The increase in the grazing area if the rope were 10 m long instead of 5 m. ($\pi = 3.14$)

4) A donor agency ensures milk is supplied in containers, which are in the form of a frustum of cone to be distributed to flood victims in a camp. The height of each frustum is 30 cm and the radii of lower and upper circular ends are 20 cm and 40 cm respectively. If this milk is available at the rate of ` 35 per litre and 8800 litres of milk is needed daily for a camp.

a) Find how many milk containers are needed daily for the camp.

b) What daily cost will put on the donor agency?