KIRAN TUTORIALS **Seat No.** | | | | | | | |

Std 10 (English) **Mathematics Part - II** **Date 01-10-20**

Time 1HRS **Chapter 7.,7.00** **Marks 20**

Q.1 Multiple Choice Questions **1**

1 Using Euler's formula, find V, if E = 30, F = 12.
a. 42 b. 18 c. 21 d. 20

Ans Option d.
V + F - E = 2

Q.2 Answer the following. **1**

1 Find the angle subtended at the centre of a circle by an arc of length 6.05 m, if the radius of the circle is 5.5 m.

Ans Here, r = 5.5 m, *l* (arc) = 6.05 m

l (arc) = $\frac{\theta}{360} \times 2\pi r$

$\therefore$ $6.05 = \frac{\theta}{360} \times 2 \times \frac{22}{7} \times 5.5$

$\therefore$ $\theta = \frac{6.05 \times 360 \times 7}{2 \times 22 \times 5.5}$ $\therefore$ $\theta = 63°$

The angle subtended by the arc at the centre is 63°

Q.3 Answer the following **4**

1 The area of a sector of a circle of 6 cm radius is 15π sq.cm. Find the measure of the arc and length of the arc corresponding to the sector.

Ans Given : area or sector = 15π cm^2
radius of sector = 6 cm
To find : measure of arc
length of arc
Solution:
area of sector $= \frac{\theta}{360} \times \pi r^2$
$\therefore$ $15\pi = \frac{\theta}{360} \times \pi \times 6^2$
$\therefore$ $15 = \frac{\theta}{360} \times 36$
$\boxed{\theta = 150^\circ}$
area of sector = $\frac{\text{length of arc} \times \text{radius}}{2}$
$15\pi = \frac{\text{length of arc} \times 6}{2}$
$\boxed{\text{length of arc} = 5\pi \text{ cm}}$
$\therefore$ length of arc is 5π cm

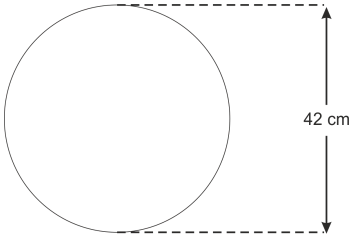
2 If the area of the minor sector is 392.5 sq. cm and the corresponding central angle is 72°, find the radius (π = 3.14).

Ans Area of minor sector = $\frac{\theta}{360} \times \pi r^2$
$\therefore 392.5 = \frac{72}{360} \times 3.14 \times r^2$
$\therefore 392.5 = \frac{1}{5} \times 3.14 \times r^2$
$\therefore \frac{392.5 \times 5}{3.14} = r^2$
$\therefore 125 \times 5 = r^2$
$\therefore 625 = r^2$
$\therefore r = 25$ cm ...(Taking square root on both side)

∴Radius of the circle is 25 cm.

Q.4 **Solve the following** **6**

1



Find the surface area and the volume of a beach ball shown in the figure.

Ans Given :diameter of beach ball = 42 cm

:radius of beach ball = 21 cm

To find :Volume and surface area of beach ball = ?

Solution :Volume of beach ball (sphere) $= \frac{4}{3} \times \pi r^3$

$= \frac{4}{3} \times \frac{22}{7} \times 21 \times 21 \times 21$

$= 4 \times 22 \times 21 \times 21$

$= 38808\ cm^3$

Surface area of beach ball $= 4\pi r^2$

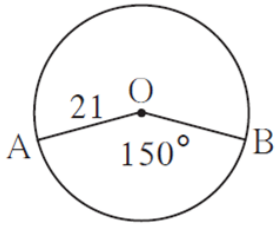
$= 4 \times \frac{22}{7} \times 21 \times 21$

$= 4 \times 22 \times 21 \times 3$

$= 5544\ cm^2$

Volume of beach ball is 38808 cm^3 and surface area of beach ball is 5544 cm^2

2 The measure of a central angle of a circle is 150 ° and radius of the circle is 21 cm. Find the length of the arc and area of the sector associated with the central angle.



Ans r = 21 cm, θ = 150, $\pi = \frac{22}{7}$

Area of the sector, $A = \frac{\theta}{360} \times \pi r^2$

$= \frac{150}{360} \times \frac{22}{7} \times 21 \times 21$

$= \frac{1155}{2} = 577.5\ cm^2$

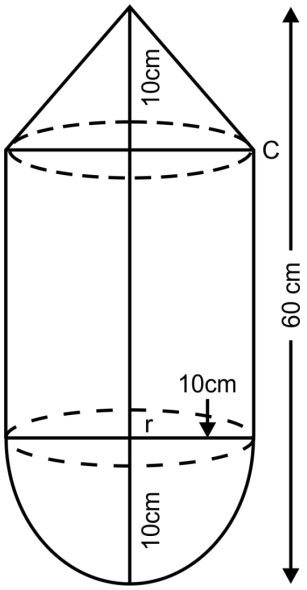
Length of the arc, $l = \frac{\theta}{360} \times 2\pi r$

$= \frac{150}{360} \times 2 \times \frac{22}{7} \times 21$

= 55 cm

Q.5 **Answer the following (Non textual)** **8**

1 A toy is a combination of a cylinder, a hemisphere and a cone, each with radius 10 cm. Height of the conical part is 10 cm and the total height is 60 cm. Find the total surface area of the toy. ($\sqrt{2}$ = 1.41)



Ans Height of the cone + height of the cylinder + height (radius) of the hemisphere = total height of the toy.

$\therefore$ 10 cm + height of the cylinder + 10 cm = 60 cm

$\therefore$ the height of the cylinder = 40 cm.

For the conical part : r = 10 cm, h = 10 cm, slant height (l) = ?

$l^2 = r^2 + h^2 = (10)^2 + (10)^2$

$= 100 + 100 = 200$

$\therefore$ $l = 10\sqrt{2}$ cm

Curved surface area of the cone = πrl ... (Formula)

$= 3.14 \times 10 \times 10\sqrt{2}$ ... (Substituting the given values)

$= 3.14 \times 10 \times 10 \times 1.41$

$= 442.74$ cm^2 ... (1)

For the cylindrical part : R = 10 cm, H = 40 cm.

Curved surface area of the cylinder = $2\pi RH$ ... (Formula)

$= 2 \times 3.14 \times 10 \times 40$ ... (Substituting the given values)

$= 2512$ cm^2 ... (2)

For the hemispherical part : r_1 = 10 cm

Curved surface area of the hemisphere = $2\pi r_1^2$ ... (Formula)

$= 2 \times 3.14 \times 10 \times 10$ ... (Substituting the given values)

$= 628$ cm^2 ... (3)

From (1), (2) and (3),

the total surface are of the toy = (442.74 + 2512 + 628) cm^2

= 3582.74 cm^2

The total surface area of the toy is **3582.74** cm^2

2 Marbles of diameter 1.4 cm are dropped into a beaker containing some water and are fully submerged. The diameter of the beaker is 7cm. Find how many marbles have been dropped in it, if the water rises by 5.6 cm.

Ans For the marble (sphere) : Diameter = 1.4 cm.

$\therefore$ r = 0.7 cm.

Volume of one marble = $\frac{4}{3}\pi r^3 = \frac{4}{3}\times\pi\times(0.7)^3$ cm^3 ... (1)

For the beaker (cylinder) : Diameter = 7 cm. $\therefore$ r = 3.5 m

Water rises by 5.6 cm. $\therefore$ h = 5.6 cm.

The volume of water (cylindrical in shape) = $\pi r^2 h$

= $\pi \times (3.5)^2 \times 5.6$ cm^3 ... (2)

The number of marbles required = $\frac{\text{The volume of water raised}}{\text{The volume of one marble}}$

$$= \frac{\pi\times(3.5)^2\times5.6}{\frac{4}{3}\times\pi\times\left(0.7\right)^3}$$

$$= \frac{3}{4}\times\frac{3.5\times3.5\times5.6}{0.7\times0.7\times0.7}$$

$$= 3\times5\times5\times2 = 150$$

150 marbles have been dropped.