## Short Answer Type Questions – II

## [3 marks]

**Que 1. The cost of levelling a ground in the form of a triangle having the sides 51m, 37m and 20m at the rate of ₹3 per $m^2$ is ₹918. State whether the statement is true or false and justify your answer.**

**Sol.** True, Let a= 51m, b=37m, c = 20m

$$s = \frac{a+b+c}{2} = \frac{51+37+20}{2} = \frac{108}{2} = 54m$$

∴ Area of triangle ground = $\sqrt{s(s-a)(s-b)(s-c)}$

$$= \sqrt{54(54-51)(54-37)(54-20)}$$

$$= \sqrt{54 \times 3 \times 17 \times 34} = 306m^2$$

Cost of levelling the ground = ₹3 × 306 = ₹918

**Que 2. There is a slide in a park, one of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the walls are 15 m, 11 m and 6 m, find the area painted in colour.**

**Sol.** Let the dimensions of triangular shape wall be

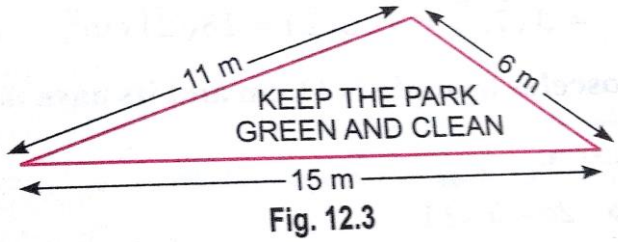

Fig. 12.3

a = 15 m, b = 6 m, c = 11 m

$$\therefore \quad s = \frac{a+b+c}{2} = \frac{15+6+11}{2} = \frac{32}{2} = 16m$$

Area Painted = Area of triangle

$$= \sqrt{s(s-a)(s-b)(s-c)}$$
$$= \sqrt{16(16-15)(16-6)(16-11)}$$
$$= \sqrt{16 \times 1 \times 10 \times 5} = 20\sqrt{2}m^2$$

**Que 3. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3: 2. Find the area of the triangle.**

**Sol.** Let each of the equal side of isosceles triangle = 3x cm
and base of isosceles triangle = 2x cm
∴ Perimeter = 3x + 3x + 2x
32 = 8x ⇒ x = 4

∴ Sides are 3 ×4, 3× 4, 2 × 4 i.e., 12 cm, 12 cm, 8 cm

Now, $s = \frac{a+b+c}{2} = \frac{12+12+8}{2} = 16\ cm$

∴ Area of triangle = $\sqrt{s(-a)(s-b)(s-c)}$
$= \sqrt{16(16-12)(16-12)(16-8)}$
$= \sqrt{16 \times 4 \times 4 \times 8} = 32\sqrt{2} cm^2$

**Que 4. In a rectangular field of diameters 60 m x 50 m, a triangular park is constructed. If the dimensions of the park is 50 m, 45 m and 35 m, find the area of the remaining field.**

**Sol.** Area of rectangular field = length × breadth = 60 × 50 = 3,000 $m^2$

Now, a = 50 m, b = 45 m and c = 35 m

$s = \frac{a+b+c}{2} = \frac{50+45+35}{2} = \frac{130}{2} = 65\ m$

By Heron's formula:
∴ Area of triangle = $\sqrt{s(-a)(s-b)(-c)}$
$= \sqrt{65(65-50)(65-45)(65-35)} = \sqrt{65 \times 15 \times 20 \times 30}$
$= \sqrt{13 \times 5 \times 5 \times 3 \times 5 \times 2 \times 2 \times 5 \times 2 \times 3}$
$= 5 \times 5 \times 3 \times 2\sqrt{13 \times 2}$
$= 150\sqrt{26} = 764.85\ m^2$ (approximately)
Hence, the remaining area
= Area of rectangle – Area of triangle
3,000 – 764.85 = 2,235.15 $m^2$

**Que 5. If the side of a rhombus is 10 cm and one diagonal is 16 cm, then the area of the rhombus is 96 cm$^2$. State whether the statement is True or False and justify your answer.**

**Sol.**

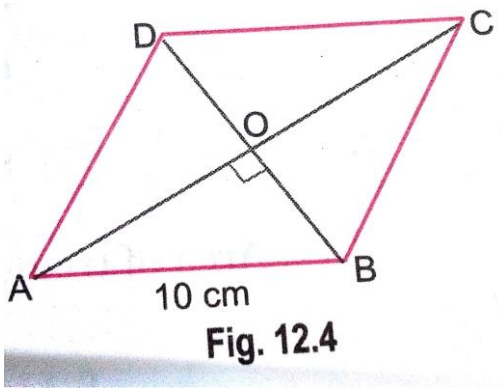

Fig. 12.4

True. AC = 16 cm

BD =? And AB = 10 cm

As the diagonals of a rhombus bisect each other at 90°

$\therefore$ OA = $\frac{1}{2}$ AC = $\frac{1}{2} \times 16 = 8$ cm

OB = $\frac{1}{2}$ BD

$\therefore$ $OA^2 + OB^2 = AB^2$

$8^2 + OB^2 = 10^2 \Rightarrow OB^2 = 100 - 64$

$OB^2 = 36 \Rightarrow OB = 6$ cm

$\therefore$ BD = 2 × OB = 2×6 = 12 cm

Area of rhombus = $\frac{1}{2}$ AC × BD= $\frac{1}{2} \times 16 \times 12 = 96 cm^2$

**Que 6. An umbrella is made by stitching 10 triangular pieces of cloth of two different designs, each piece measuring 20 cm, 50 cm. How much cloth of each design is required for the umbrella?**

**Sol.** The sides of triangular pieces are 20 cm, 50 cm and 50 cm.

Let, a = 20 cm, b = 50 cm, c = 50 cm

$\therefore$ Semi-Perimeter, $s = \frac{a+b+c}{2} = \frac{20+50+50}{2}$

$$s = 60\ cm$$

$\therefore$ Area Of one triangular Piece $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{60(60-)(60-50)(60-50)}$

$= \sqrt{60 \times 40 \times 10 \times 10} = 200\sqrt{6} cm^2$

Cloth of each design required = Area of 5 triangular pieces

$= 5 \times 200\sqrt{6} = 1000\sqrt{6} cm^2$

**Que 7. The sides of a triangular field are 41 m, 40 m and 9 m. Find the number of rose beds that can be prepared in the field, If each rose bed on an average needs 900cm$^2$ space.**

**Sol.** Let a = 41 m, b = 40 m, c = 9 m.

$s = \frac{a+b+c}{2} = \frac{41+40+9}{2} = \frac{90}{2} \qquad \Rightarrow s = 45\ m$

Area of the triangular field $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{45(45-41)(45-40)(45-9)}$

$= \sqrt{45 \times 4 \times 5 \times 36} = 180\ m^2 = 1800000\ cm^2$

Number of rose beds $= \frac{Total\ area}{Area\ needed\ for\ one\ rose\ bed} = \frac{1800000}{900}$ = 2000