Perimeter
Solution

1. **Ans.(B)**

Perimeter of rectangle = 2 (length + width) = 2 (12 + 8) = 40 cm

Given that,

Perimeter of rhombus = perimeter of rectangle ………..(i)
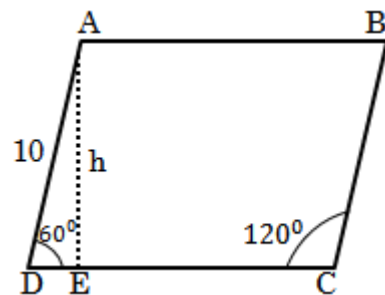
Let the side of the rhombus be a cm,

From equation (i),

4a = 40

a = 10

In Δ ADE

$sin\ 60° = \dfrac{h}{10}$

$\Rightarrow \dfrac{\sqrt{3}}{2} = \dfrac{h}{10}$

Height (h) = 5 √3 cm

Area of rhombus. = Base × height

$= 10 \times 5\sqrt{3}$

$= 50\sqrt{3}\,cm^2$

2. **Ans.(B)**

Area of the circle= πr^2

∴ Cost at Rs.10 per square meter = Rs.1540

∴ Area of the circle $= \dfrac{1540}{10}$

$= 154$

$\pi r^2 = 154$

$r^2 = \dfrac{154 \times 7}{22}$

$r^2 = 49$

$r = 7$ m

Circle perimeter $= 2\pi r$

$= 2 \times \dfrac{22}{7} \times 7$

$= 44$ m
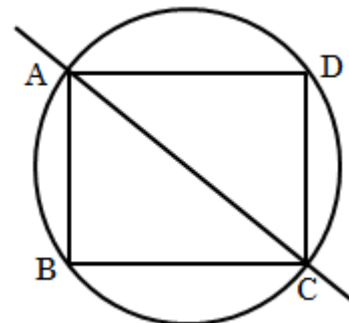
Cost of fencing at the rate of Rs. 6 per meter = $6 \times 44 = $ Rs.264

3. **Ans.(A)**

In a cyclic quadrilateral, the bisector of the opposite angle will pass through the center.

Therefore,

XY = AC

And AC is the diameter of the circle.

$\boxed{XY = 2r}$

4. **Ans.(B)**

On condition –

$2\pi r - 2r = 15$

$2r(\pi - 1) = 15$

$2r\left(\dfrac{22}{7} - 1\right) = 15$

$2r\left(\dfrac{15}{7}\right) = 15$

$2r = 7$

$\boxed{r = 3.5m}$

5. **Ans.(C)**

Let the inner radius of the ring = r_1

And outer radius = r_2

According to Question –

$2\pi r_1 = 22$	$2\pi r_2 = 44$

$2 \times \frac{22}{7} \times r_1$ $= 22$ $r_1 = \frac{7}{2} cm$	$2 \times \frac{22}{7} r_2 = 44$ $r_2 = 7cm$

Ring thickness $= r_2 - r_1$

$= 7 - \frac{7}{2} = \frac{7}{2} cm = 3.45$ cm

6. Ans.(B)

Let the external radius $= r_1$

Internal radius $= r_2$

Given,

Circumference of circle

$2\pi r_1 = 220$

$\Rightarrow r_1 = 35m$

$\Rightarrow 2\pi r_2 = 44 \Rightarrow r_2 = 7m$

The area of the garden including the road $=$

$2\pi r_1^2 = \frac{22}{7} \times 35 \times 35$

$= 3850$ m^2

Garden area $= 2\pi r_2^2 = \frac{22}{7} \times 7 \times 7 =$ $154 m^2$
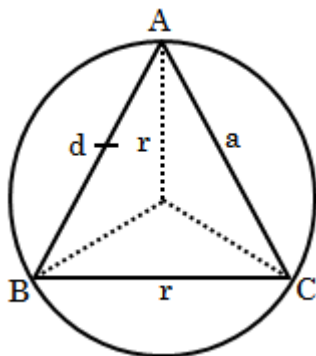
Area of the road $= 3850 - 154 = 3696 m^2$

7. Ans.(D)

Area of equilateral $\Delta = \frac{\sqrt{3}}{4} a^2$

$\frac{\sqrt{3}}{4} \times a^2 = 9\sqrt{3}$

$a^2 = 36$

$a = 6$

Radius of circumcircle of equilateral triangle with side a =

$\frac{a}{\sqrt{3}} = \frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$= 2\sqrt{3}$

Area of the circle $= \pi r^2$

$= \pi \times 2\sqrt{3} \times 2\sqrt{3}$

Hence the area of the circle $= 12\pi$

8. Ans.(D)

Let the outer radius of the ground $= R$

Internal radius of the field $= r$

Outer perimeter of the field $= 2\pi R$

$2\pi R = 154$

$\pi R = 77$

$R = 49/2$

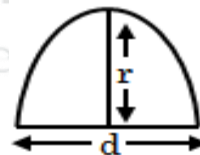Internal circumference of the field $2\pi r$

$2\pi r = 88$

$\pi r = 44$

$r = 14$

Field width $= R - r = \frac{49}{2} - 14$

$= \frac{49 - 28}{2} = \frac{21}{2} = 10.5m$

9. Ans.(C)

$\therefore$ Diameter of semicircle $= 14m$

$2r = 14$

$r = 7$ m

Perimeter of semicircle $= \pi r + 2r$

$= \frac{22}{7} \times 7 + 14$

$= 22 + 14 = 36m$

10. Ans.(B)

Wheel diameter $= 56$ cm

$d = 56cm$

$\therefore r = \frac{d}{2}$

$r = \frac{56}{2} = 28cm$

Let the wheel rotate n times to cover a distance of 88 km

$n \times 2\pi r = 88km$ [1km = 100000cm]

$n = \dfrac{88 \times 100000}{2 \times \frac{22}{7} \times 28}$

$n = \dfrac{88 \times 100000}{2 \times 88}$

$n = 50000$

11.   **Ans.(A)**

Number of days $= \dfrac{\text{Volume of cuboid}}{\text{Population} \times \text{Requirement}}$

$= \dfrac{15 \times 8 \times 6 \times 1000}{4000 \times 9}$ ($\because$ 1 meter^3 = 1000 liter)

= 20 days

12.   **Ans.(A)**

If the length of each core of the cube = a unit

$\therefore$ Sum of lengths of cube cores = 12a unit

If each side of the square = b,

then the perimeter of the square = 4b unit

First condition,

$12a = \dfrac{3}{5} \times 4b$

or $a = \dfrac{b}{5}$

Now according to the second condition,

$a^3 = b^2$

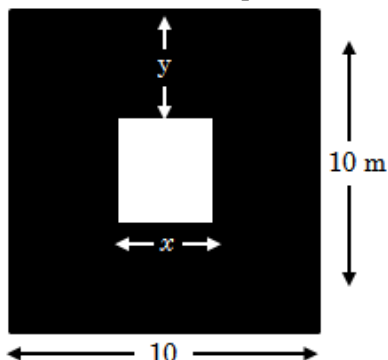or, $\left(\dfrac{b}{5}\right)^3 = b^2$

or, $\dfrac{b^3}{125} = b^2$

or $\boxed{b = 125}$ Now the perimeter of the square $= 4b = 4 \times 125 = 500$ unit

13.   **Ans.(D)**

Let the side of the square tank = x m

$\therefore$ Area of square tank (covered with carpet)

$= x^2$

Area of oil cloth $= 10 \times 10 - x^2$

$= 100 - x^2$

$\therefore 15x^2 + 6.50(100 - x^2) = 1338.50$

$15x^2 + 650 - 6.5x^2 = 1338.50$

$8.5x^2 = 688.50$

$x^2 = \dfrac{688.5}{8.5}$

$x^2 = 81$

$x = 9$
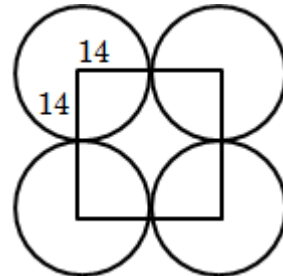
$\therefore$ Width of oil cloth border $= \dfrac{10-x}{2}$

$= \dfrac{10-9}{2} = \dfrac{1}{2}$ meter.

14.   **Ans.(A)**

Area of square = 28^2 = 784 cm^2

Hence the area of the four sectors

$= 4 \times \dfrac{\theta}{360} \pi r^2$

$4 \times \dfrac{90}{360} \times \dfrac{22}{7} \times 14 \times 14$

$= 616$

Area of the center of the square = area of the square. – Area of territories

$= 784 - 616 = 168$ cm^2

15.   **Ans.(D)**

Let the side of the square = a m

Area of square (a^2) = 31684 m^2

a = 178 m

Perimeter of Square = 4a
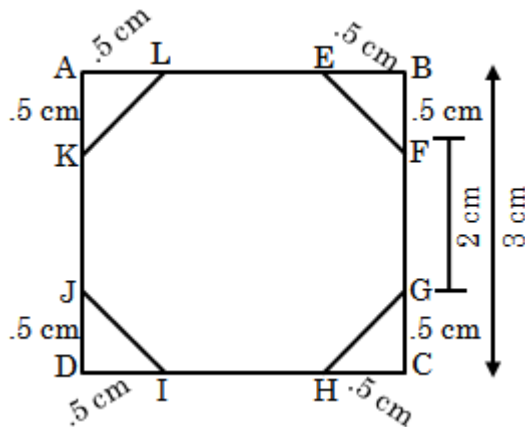
$= 4 \times 178 = 712m$

According to Question –

1 wire length $= 712 \times \dfrac{105}{100} = 747.60$

Total length of all four wires $= 747.60 \times 4$
$= 2990.40 m$

16. **Ans.(D)**

$$EF = GH = IJ = KL = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2}$$

$$= \frac{1}{\sqrt{2}}$$

Perimeter of octagon = LE + EF + FG + GH +
HI + IJ + JK + KL

$$= 2 + \frac{1}{\sqrt{2}} + 2 + \frac{1}{\sqrt{2}} + 2 + \frac{1}{\sqrt{2}} + 2 + \frac{1}{\sqrt{2}}$$
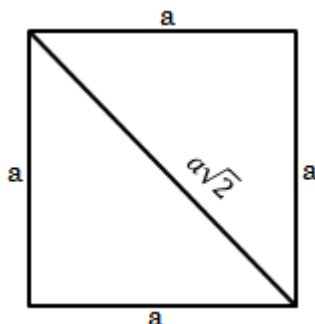
$$= 8 + \frac{4}{\sqrt{2}}$$

$$= (8 + 2\sqrt{2}) cm$$

Area of the octagon. = Area of the square. – 4
× area of cut triangular part.

$$= (3)^2 - 4 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$$

$$= 8.5 cm^2$$

17. **Ans.(A)**

According to question,
Area of the square = half of the diagonal of
the square

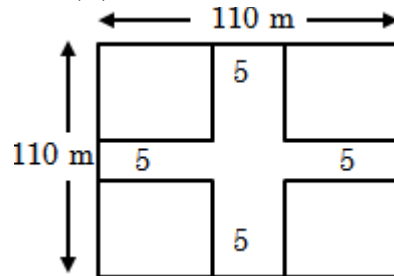$$a^2 = a\sqrt{2} \times \frac{1}{2}$$

$$a = \frac{1}{\sqrt{2}}$$

Diagonal of square $= a\sqrt{2}$

$$= \frac{1}{\sqrt{2}} \times \sqrt{2} = 1$$

18. **Ans.(C)**

Area of the square field = 110 ×110
= 12100 m
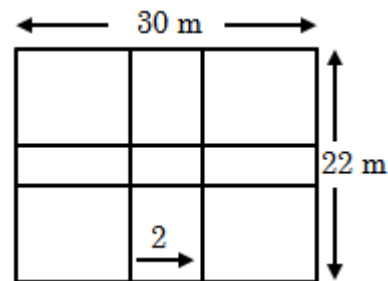Remaining area after taking out the road
= 105 × 105 = 11025 m²
Hence the area of the road = 12100 – 11025
= 1075 m²

19. **Ans.(D)**

Road area = 30 ×2 + 22 × 2 – 2 × 2
= 100 sq m.
Total cost of 1 sq m = Rs. 15
Total cost of 100 sq m = 15 × 100 = Rs. 1500

20. **Ans.(C)**
Let the length of one side of the cube = a unit

And the length of the side of the square = b unit

∴ Number of sides / edges in the cube = 12

According to Question,

$12a = (4b) \times 2$

$12a = 8b$

$a = \dfrac{2}{3}b$ unit

Volume of the cube = area of the square

$a^3 = b^2$

$\left(\dfrac{2}{3} \times b\right)^3 = b^2$

∴ $b = \dfrac{27}{8}$ unit

So the perimeter of the square = 4 × side =

$4 \times b = 4 \times \dfrac{27}{8} = 13.5$ unit.