## 26. GEOMETRY- MENSURATION

| | | |
|---|---|---|
| **Perimeter**<br>(Sum of all the sides) | Triangle<br>Square<br>Rectangle<br>Circle | (a + b + c)/2<br>4 x side<br>2(l+h)<br>$2\pi r$ |
| **Area** | Triangle<br>Square<br>Rectangle<br>Trapezium<br>Rhombus<br>Parallelogram<br>Circle | (½)*base*height<br>Side*side<br>length*breadth<br>(½)*h*(a+b)<br>$\frac{1}{2}*d_1*d_2$<br>base*height<br>$\pi r^2$ |
| **Curved Surface Area**<br>(Area of the surfaces excluding top and base surfaces) | Cube<br>Cuboid<br>Cylinder<br>Cone<br>Semi-Sphere | $4 (side)^2$<br>2lh+2bh<br>$2\pi rh$<br>$\pi rl (1 = \sqrt{r^2 + h^2})$<br>$2\pi r^2$ |
| **Total Surface Area**<br>(Area of the surfaces including top and base surfaces) | Cube<br>Cuboid<br>Cylinder<br>Cone<br>Sphere<br>Semi-Sphere | $6(side)^2$<br>2(lb+lh+hb)<br>$2\pi rh+2\pi r^2$<br>$\pi rl+\pi r^2$<br>$4\pi r^2$<br>$2\pi r^2+\pi r^2$ |
| **Volume** | Cube<br>Cuboid<br>Cylinder<br>Cone<br>Sphere<br>Semi-Sphere<br>Hollow Sphere | $(side)^3$<br>L *b * h<br>$\pi r^2h$<br>$(1/3)\pi r^2h$<br>$4\pi r^3$<br>$2\pi r^3$<br>$4\pi (R^3-r^3)$ |

| No. of sides | Polygon | Sum of Angles (2n-4)90 | *No. of diagonals n(n-3)/2* |
|---|---|---|---|
| *3* | *Triangle* | *180* | *0* |
| *4* | *Quadrilateral* | *360* | *2* |
| *5* | *Pentagon* | *540* | *5* |
| *6* | *Hexagon* | *720* | *9* |
| *7* | *Heptagon* | *900* | *14* |
| *8* | *Octagon* | *1080* | *20* |
| *9* | *Nonagon* | *1260* | *27* |
| *10* | *Decagon* | *1440* | *35* |
| *11* | *Hendecagon* | *1620* | *44* |
| *12* | *Dodecagon* | *1800* | *54* |

**Practice Exercise**

***Directions for questions 1 to 20:*** Select the correct alternative from the given choice.

1. $S_2$ is a square formed by joining the midpoints of sides of square $S_1$.$S_3$ is a square formed by joining the midpoints of sides of square $S_2$ and so on. Find the area of the square $S_5$, if area of square $S_1$ is 16 $cm^2$.
(1) 1 $cm^2$ (2) 4 $cm^2$ (3) 8 $cm^2$ (4) 2 $cm^2$

2. In $\Delta$ ABC, AD $\perp$ BC & CE $\perp$ AB. If BC = 12 cm, AB = 18 cm &AD = 6 cm, find CE.
(1) 3 cm (2) 4 cm (3) 7 cm (4) 6 cm

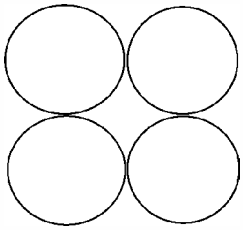
3. If the sides of a triangle are integers and two of them are 8 cm and 11 cm. Find the maximum possible perimeter of the triangle.
(1) 38 (2) 25 (3) 37 (4) 30

4. Number of diagonals in a regular Heptagon=
(1)14 (2)20 (3) 16 (4)15

5. Two cows are tied to the opposite corners of a rectangular field of dimensions 28 m × 14 m with a rope of length 7 m. Find the area of the field that cannot be grazed by the cows.
(1) 250 Sq.m (2) 275 Sq.m
(3) 315 Sq.m (4) 335 Sq.m

6. Three cubes each of edge 5 cm are joined to form a cuboid. Find the total surface area of the cuboid so formed. (in $cm^2$)
(1) 224 (2) 250 (3) 350 (4) 950

7. In the following figure, find the area among the circles. Radius of each circle is 7 cm.(in Sq.cm)



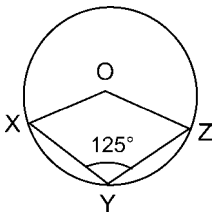
(1) 49 (2) 42 (3) 36 (4) 56

8. A wire bent to form a circle and rebent to form a square of area 121 $cm^2$. Find area of the circle.(Sq.cm)
(1) 144 (2) 154 (3) 181 (4) 125

9. Find the interior angle and exterior angle of a regular pentagon.
(1) 100°,80° (2) 120°, 60°
(3) 135°, 45° (4) 108°, 72°

10. Two parallel chords of equal length of 24 cm are drawn in a circle of radius 13 cm. Find the distance between the chords(in cm).
(1) 16 (2) 8 (3) 10 (4) 24

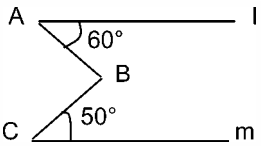
11.




Find the obtuse angle XOZ in the above figure, where O is the centre of the circle.
(1) 120° (2)125° (3)110° (4)180°

12. ABC is an equilateral triangle inscribed in a circle. If the side of the triangle is 12 cm, what is the area of the circle (in Sq.cm)?
(1) $9\pi$ (2) $12\pi$ (3) $36\pi$ (4) $48\pi$

13. Find angle ABC in the figure given below, if lines l and m are parallel.




(1) 110° (2) 100° (3)70° (4)140°

14. In a question it was asked to find the volume of a cylinder with diameter 7 cm and height 6 cm. Vivek calculated the volume by taking the height as 7 cm and diameter 6 cm. What is the difference in the answers (in c.c)?
(1) 33 (2) 42 (3)56 (4) 48

15. Find the side of a new cube formed by melting three cubes with sides of 3 cm, 4 cm and 5 cm respectively.
(1) 16 cm (2) 12 cm (3) 6 cm (4) 8cm

16. Find the area of the square inscribed in a circle of radius 7 2 cm (in Sq.cm)
(1) 148 (2) 100 (3) 392 (4) 196

17. The wheel of a cycle covers 880 m by making 500 revolutions. What is the diameter of the wheel (in cm)?
(1) 42 (2) 56 (3) 84 (4) 28

18. A square courtyard has a side measuring 12 metres. How many tiles, each measuring 1.5 m x 2 m, are required to pave the square courtyard?
(1) 54 (2) 36 (3) 44 (4) 48

19. The area of the floor of a circular based conical tent is 616sq.feet. If the height of the tent is 48 feet, find the cost of canvas required for the tent at the rate of Rs.2.5 per Sq.feet (in Rs.).
(1) 1100 (2) 15600 (3) 2200 (4) 5500

20. If the radius of a sphere is doubled, then its volume increases by
(1) 100% (2) 200% (3) 400% (4) 700%

21. The size of a wooden block is 1*5*10 cm. Find the number of blocks needed to construct a wooden cube of side 50 cm.
(1) 500 (2) 100 (3) 2500 (4) 50

22. Find the area of the largest circle that can be inscribed in a square of side 8 cm.
(1) $16\pi$ (2) $8\pi$ (3) $32\pi$ (4) $64\pi$

23. The sides of a rectangular park are in the ratio 3:4. If the perimeter of the park is 700m, then what is the length of the longest stick that can be placed in the park? (in meters)
(1) 250 (2) 350 (3) 300 (4) 200

24. If the area of the regular hexagon is $96\sqrt{3}$ $cm^2$, then the perimeter of the hexagon is.
(1) 64cm (2) 48cm (3) 96cm (4) 36cm

25. The area of the square field is 20000 sq m. Nisha crosses the field diagonally at the rate of 4 km/hr.

Find the time taken by Nisha to cross the field. (In minutes)
(1) 6 (2) 30 (3) 3 (4) 5

26. There is a rectangular Garden whose length and width is 60m & 20m.There is a walkway of uniform width around garden. Area of walkway is 516m2. Find width of walkway.
(1) 4m (2) 3m (3) 2m (4) 1m

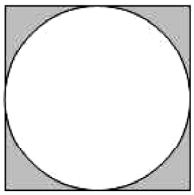
27. A cone of height 9 cm with diameter of its base 18 cm is carved out from a wooden solid sphere of radius 9 cm. Find the percentage of the wood wasted.
(1) 50% (2)40% (3)75% (4)25%

28. Four horses are tethered at 4 corners of a square field of side 70 meters so that they just cannot reach one another. Find the area of the field not grazed by the horses. (In $m^2$)
(1) 1050 (2) 3850 (3) 950 (4) 1075

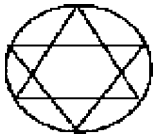
29. Ram a farmer, managed to grow shaped watermelons inside glass cases of different shapes. The shapes he used were: a perfect cube, hemi-spherical, cuboid, cylindrical along with the normal spherical shaped watermelons. Thickness of the skin was same for all the shapes. Each of the glass cases was so designed that the total volume and the weight of the all the water-melons would be equal irrespective of the shape. A customer wants to buy water-melon for making juice, for which the skin of the water-melon has to be peeled off, and therefore is a waste. Which shape should the customer buy?
(1) Cube (2) Hemi-sphere (3) Cubiod
(4) Normal spherical (5) Cylinder

30. The circumference of the front wheel of a cart is 30 feet long and that of the back wheel is 36 feet long. What is the distance travelled by the cart, when the front wheel has done 5 more revolutions than the rear wheel?
(1) 250 (2) 600 (3) 750 (4) 900

31. If the radius of the circle below is 10, what is the area of the shaded region?
(1) 40 - 20 $\pi$ (2) 100 - 25 $\pi$
(3) 400 - 100 $\pi$ (4) 100
(5) 400 - 20 $\pi$

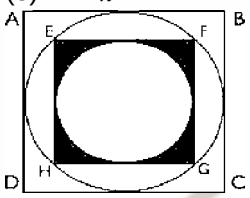


32. Two equilateral triangles of side 12 units are drawn one upon the other to form a star & a common circum circle is drawn to them. Find the area enclosed in the circle but not in star.



(1) 48( $\pi$ - $\sqrt{3}$ ) (2) 48( $\sqrt{3}$ - $\pi$ )
(3) 40( $\pi$ - $\sqrt{3}$ ) (4) 48 $\pi$ -36 $\sqrt{3}$
(5) None of the above

33. Viewed from the outside inward, the figure above depicts a square-circle-square-circle, each enclosed within the other. If the area of square ABCD is 2 square units, then which of the following expresses the area of the darkened corners of square EFGH?
(1) 2-¼ $\pi$ (2) 2-½ $\pi$ (3) 1-¼ $\pi$
(4) ½ -1/8 $\pi$ (5) 1 -½ $\pi$




34. In a cylinder, radius of the base is 7 cm and surface area S = 210pi $cm^2$. Find the volume of the cylinder. (in $cm^3$)
(1) 2530 (2) 2350 (3) 2035 (4) 2305

35. A box needs to be covered in brown paper for mailing. If the box measures 3 feet by 3 feet by 2 feet, what is the surface area (in sq.ft) of the box that will need to be covered? The box is closed.
(1) 18 (2) 42 (3) 54 (4) 48

36. A beam 9 m long, 40 cm wide and 20 cm high is made up of iron which weighs 50 kg per cubic metre. The weight of the beam is..
(1) 56 kg (2) 48 kg (3) 36 kg (4) 27 kg

37. How many bags of grain can be stored in a cuboid granary12 mx 6 in x 5 m, if each bag occupies a space of 0.48 cu. metre?
(1) 75 (2) 480 (3) 750 (4) 288

38. The ratio of the volume of a cube to that of a sphere which will fit inside the cube is...
(1) 6: $\pi$ (2) 4: $\pi$ (3) 2: $\pi$ (4) 3: $\pi$

39. If the length of diagonal of a cube is 4 $\sqrt{3}$ cm, then its surface area is (in $cm^2$):
(1) 96 (2) 24 (3) 54 (4) 216

40. The maximum length of a pencil that can he kept is a rectangular box of dimensions 8 cm x 6 cm x 2 cm, is (in cm):
(1) 2 $\sqrt{2}$ (2) 2 $\sqrt{14}$ (3) 2 $\sqrt{26}$ (4) 10 $\sqrt{2}$

| Geometry & Mensuration | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | **6** | 3 | **11** | 3 | **16** | 4 | **21** | 3 | **26** | 2 | **31** | 3 | **36** | 3 |
| **2** | 2 | **7** | 2 | **12** | 4 | **17** | 2 | **22** | 1 | **27** | 3 | **32** | 1 | **37** | 3 |
| **3** | 3 | **8** | 2 | **13** | 1 | **18** | 4 | **23** | 1 | **28** | 1 | **33** | 3 | **38** | 1 |
| **4** | 1 | **9** | 4 | **14** | 1 | **19** | 4 | **24** | 2 | **29** | 4 | **34** | 2 | **39** | 1 |
| **5** | 3 | **10** | 3 | **15** | 3 | **20** | 4 | **25** | 3 | **30** | 4 | **35** | 2 | **40** | 3 |