

**GRAND TEST – 1**

**SYLLABUS : Surface Area and Volume Area related to Circles, Statistics, Probability, Trigonometry Height and Distance, Circles**

**General Instructions:**

- All questions are compulsory. Maximum Marks are 60.
- The question paper consists of 27 questions divided into four sections A, B, C and D.
  - Section - A: Q. No. 1 to 10 carries **1 mark** each.
  - Section - B: Q. No. 11 to 16 carries **2 marks** each.
  - Section - C: Q. No. 17 to 22 carries **3 marks** each.
  - Section - D: Q. No. 23 to 27 carries **4 marks** each.
  - Time allotted is **2 hours. The maximum marks are 60.**

**SECTION – A : (1×10 =10)**

1. If  $\sec 5A = \operatorname{cosec}(A+30^\circ)$ , where  $5A$  is an acute angle, then the value of  $A$  is  
 (a)  $15^\circ$                       (b)  $5^\circ$                       (c)  $20^\circ$                       (d)  $10^\circ$
2. If a regular hexagon is inscribed in a circle of radius  $r$ , then its perimeter is  
 (a)  $3r$                       (b)  $6r$                       (c)  $9r$                       (d)  $12r$
3. If the perimeter of one face of a cube is 20 cm, then its surface area is  
 (a)  $120 \text{ cm}^2$                       (b)  $150 \text{ cm}^2$                       (c)  $125 \text{ cm}^2$                       (d)  $400 \text{ cm}^2$
4. The chords  $AB$  and  $CD$  of a circle intersect at  $E$  such that  $AE = 2.4 \text{ cm}$ ,  $BE = 3.2$  and  $CE = 1.6 \text{ cm}$ . The length of  $DE$  is  
 (a)  $1.6 \text{ cm}$                       (b)  $3.2 \text{ cm}$                       (c)  $4.8 \text{ cm}$                       (d)  $6.4 \text{ cm}$
5.  $(\cos^4 A - \sin^4 A)$  is equal to  
 (a)  $1 - 2\cos^2 A$                       (b)  $2\sin^2 A - 1$                       (c)  $\sin^2 A - \cos^2 A$                       (d)  $2 \cos^2 A - 1$
6. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. Find the probability that the arrow will point at any factor of 8?
7. A pole casts a shadow of length  $2\sqrt{3} \text{ m}$  on the ground, when the Sun's elevation is  $60^\circ$ . Find the height of the pole.

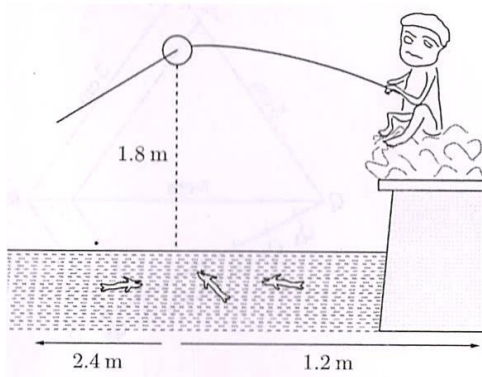
**OR**

An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

8. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of larger circle (in cm) which touches the smaller circle.
9. Length of arc of a sector angle  $45^\circ$  of circle of radius 14 cm is .....
10. The length of the diagonal of a cube that can be inscribed in a sphere of radius 7.5 cm is .....

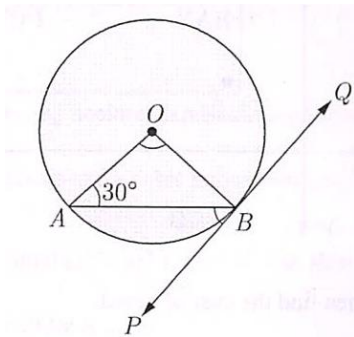
**SECTION – B : (2 × 6 = 12)**

11. Pawan is fly fishing in a stream as shown in the figure. The tip of her fishing rod is 1.8 m above the surface of the water and the fly at the end of the string rests on the water 3.6 m away and 2.4 m from a point directly under the tip of the rod.



Assuming that her string (from the tip of her rod to the fly) is taut, how much string does she have out?

12. In the figure. PQ is tangent to a circle with center O, if  $\angle OAB = 30^\circ$ , find  $\angle ABP$  and  $\angle AOB$ .



**OR**

A circle is inscribed in a  $\Delta ABC$ , with sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively. Find the length of AD, BE and CF.

13. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

**OR**

A metallic solid sphere of radius 4.2 cm is melted and recast into the shape of a solid cylinder of radius 6 cm. find the height of the cylinder.

14. The diameter of a wheel is 1.26m. what the distance covered in 500 revolutions.

15. Find the mean of the data using an empirical formula when it is given that mode is 50.5 and median in 45.5

**OR**

A bag contains 6 red and 5 blue balls. Find the probability that the ball drawn is not red.

16. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

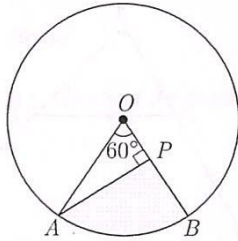
**SECTION – C: (3 × 6 = 18)**

17. From the top of tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression  $30^\circ$  &  $45^\circ$  respectively. Find the distance between the cars. (Use  $\sqrt{3} = 1.73$ )

**OR**

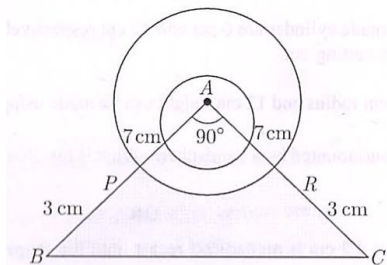
From the top of a 7 m high building, the angle of elevation of the top of a tower is  $60^\circ$  and the angle of depression of its foot is  $45^\circ$ . Find the height of the tower. (Use  $\sqrt{3} = 1.732$ )

18. In the given figure, AOB is a sector of angle  $60^\circ$  of a circle with centre O and radius 17 cm. If  $AP \perp OB$  and  $AP = 15$  cm, find the area of the shaded region.



**OR**

A memento is made as shown in the figure. Its base PBCR is silver plate from the Front side. Find the area which is silver plated. Use  $\pi = \frac{22}{7}$ .



19. If  $2 \cos \theta - \sin \theta = x$  and  $\cos \theta - 3 \sin \theta = y$  Prove that  $2x^2 + y^2 - 2xy = 5$

20. In an acute angled triangle ABC, if  $\sin (A + B - C) = \frac{1}{2}$  and  $\cos (B + C - A) = \frac{1}{\sqrt{2}}$ , find  $\angle A$ ,  $\angle B$ ,  $\angle C$ .

21. Milk in a container, which is in the form of frustum of a cone of height 30 cm and the radii of whose lower an upper circular ends are 20 cm and 40 cm respectively, is to be distributed in a camp for flood victims. If this milk is available at the rate of Rs 35 per litre and 880 litre of milk is needed daily for a camp, find how many such containers of milk are needed for a camp and what cost will it put on the donor agency for this. What value is indicated through this by the donor agency?

22. Two types of water tankers are available in a shop at the same cost. One is in a conical form of diameter 1m and height 2m and another is in the form of a cylinder of diameter 1 m and height 1.5 m. The shopkeeper advice to purchase cylindrical tanker. Out of the two tankers, whose volume or quantity is more and by how much?

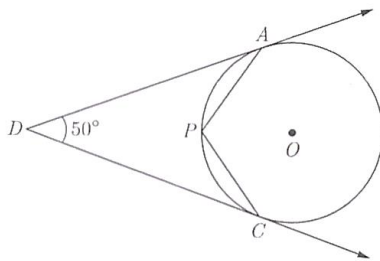
**SECTION – D: ( 4 × 5 = 20)**

23. During the medical check-up of 35 students of a class, their weights were recorded follows:

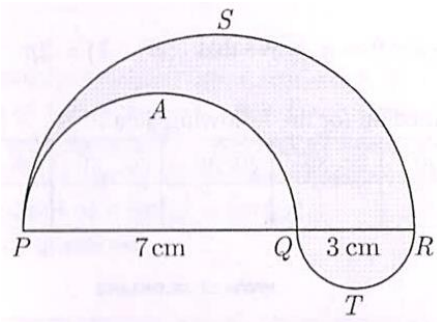
Weight (in kg)	No. of Students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a **less than type ogive** for the above data. Hence, obtain the median weight from the graph and **verify the result by using the formula.**

24. In the given figure, O is the centre of the circle, Determine  $\angle APC$ , if DA and DC are tangents and  $\angle ADC = 50^\circ$ .



25. In the fig, PSR, RTQ and PAQ are three semi-circles of diameters 10 cm, 3 cm and 7 cm region. Use  $\pi = \frac{22}{7}$ .



26. Find the value of x and y, if the median for the following data is 31.

Classes	0- 10	10- 20	20- 30	30- 40	40- 50	50- 60	Total
Frequency	5	x	6	y	6	5	40

**OR**

If  $\tan A = n \tan B$  and  $\sin A = n \sin B$ . Prove that  $\cos^2 A = \frac{m^2-1}{n^2-1}$

27. Find the value of x

$$4\left(\frac{\sec^2 59^\circ - \cot^2 31^\circ}{3}\right) - \frac{2}{3} \sin 90^\circ + 3 \tan^2 56^\circ \times \tan^2 34^\circ = \frac{x}{3}$$