

Time: 3 hour

Total Marks: 90

General Instructions:

1. All questions are **compulsory**.
 2. The question paper consists of **34** questions divided into **four sections** A, B, C, and D.
 3. **Section A** contains of **8** questions of 1 mark each, which are multiple choice type question, **Section B** contains of **6** questions of 2 marks each, **Section C** contains of **10** questions of 3 marks each and **Section D** contains of **10** questions of 4 marks each.
 4. Use of calculator is **not** permitted.
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SECTION – A

1. The angle of depression of a car, standing on the ground, from the top of a 75 m high tower, is 30° . The distance of the car from the base of the tower (in m.) is:

(A) $25\sqrt{3}$

(B) $50\sqrt{3}$

(C) $75\sqrt{3}$

(D) 150

2. The probability of getting an even number, when a die is thrown once, is:

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{1}{6}$

(D) $\frac{5}{6}$

3. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime-number less than 23, is:

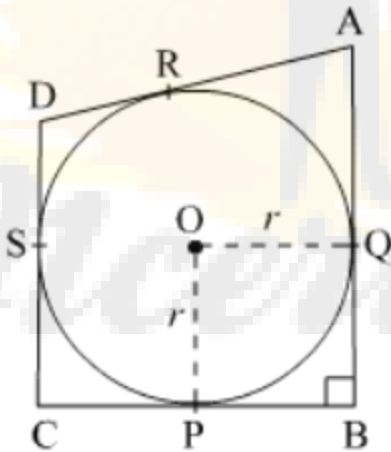
(A) $\frac{7}{90}$

(B) $\frac{10}{90}$

(C) $\frac{4}{45}$

(D) $\frac{9}{89}$

4. In fig., a circle with centre O is inscribed in a quadrilateral ABCD such that, it touches the sides BC, AB, AD and CD at points P, Q, R and S respectively, If $AB = 29$ cm, $AD = 23$ cm, $\angle B = 90^\circ$ and $DS = 5$ cm, then the radius of the circle (in cm) is:



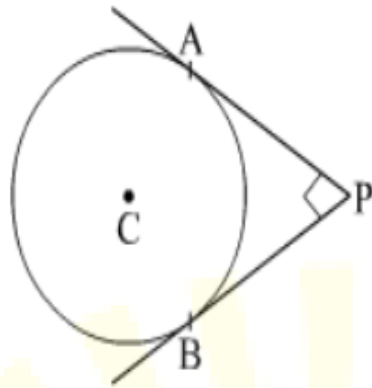
(A) 11

(B) 18

(C) 6

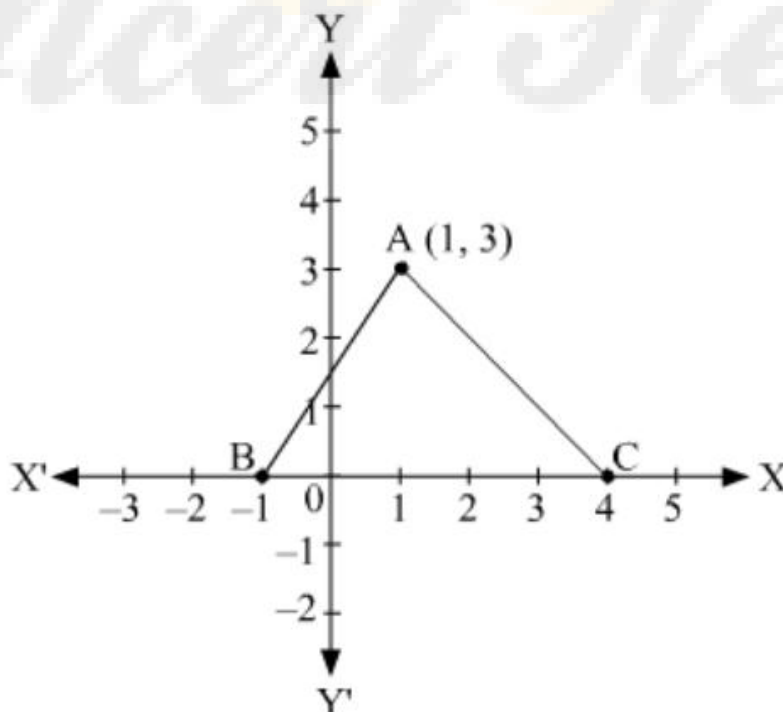
(D) 15

5. In fig., PA and PB are two tangents drawn from an external point P to a circle with centre C and radius 4 cm. If $PA \perp PB$, then the length of each tangent is:



- (A) 3cm
(B) 4cm
(C) 5cm
(D) 6cm

6. In fig., the area of triangle ABC (in sq. units) is:



- (A) 15
- (B) 10
- (C) 7.5
- (D) 2.5

7. If the difference between the circumference and the radius of a circle is 37 cm, then using $\pi = \frac{22}{7}$, the circumference (in cm) of the circle is:

- (A) 154
- (B) 44
- (C) 14
- (D) 7

8. The common difference of AP $\frac{1}{3q}, \frac{1-6q}{3q}, \frac{1-12q}{3q}, \dots$ is:

- (A) q
- (B) $-q$
- (C) -2
- (D) 2

SECTION B

9. Prove that the parallelogram circumscribing a circle is a rhombus.
10. Two circular pieces of equal radii and maximum area, touching each other are cut out from a rectangular card board of dimensions $14 \text{ cm} \times 7 \text{ cm}$. Find the area of the remaining card board. $\left[\text{Use } \pi = \frac{22}{7} \right]$
11. In fig., a circle is inscribed in triangle ABC touches its sides AB, BC and AC at points D, E and F respectively. If $AB = 12 \text{ cm}$, $BC = 8 \text{ cm}$ and $AC = 10 \text{ cm}$, then find the length of AD, BE and CF.

12. How many three-digit natural numbers are divisible by 7?

13. Solve the following quadratic equation for x:

$$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$$

14. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is neither a king nor a queen.

SECTION C

15. A vessel is in the form of hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14 cm and the total height of the vessel is 13 cm. Find the total surface area of the vessel.

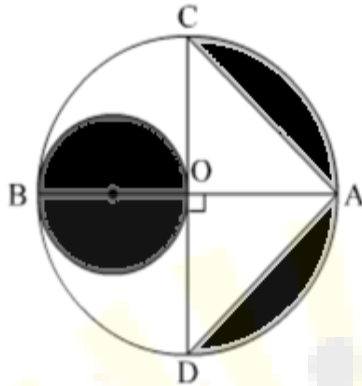
$$\left[\text{Use } \pi = \frac{22}{7} \right]$$

16. A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the volume of wood in the toy. $\left[\text{Use } \pi = \frac{22}{7} \right]$

17. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find: (i) the length of the arc (ii) area of the sector formed by the arc.

$$\left[\text{Use } \pi = \frac{22}{7} \right]$$

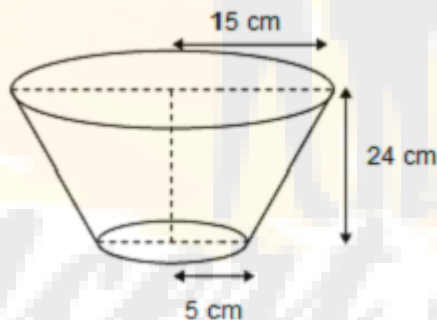
18. In Fig., AB and CD are two diameters of a circle with centre O, which are perpendicular to each other. OB is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region. [Use $\pi = \frac{22}{7}$]



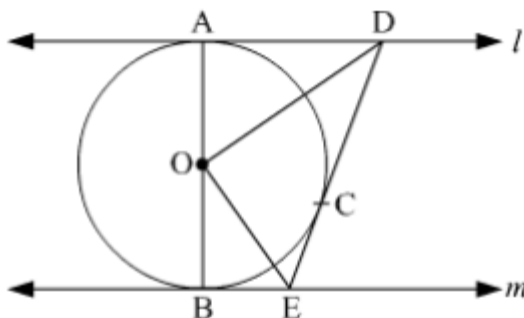
19. Find the ratio in which the y-axis divides the line segment joining the points (-4, -6) and (10, 12). Also, find the coordinates of the point of division.
20. The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30° . If the height of the second pole is 24 m, find the height of the first pole. [Use $\sqrt{3} = 1.732$]
21. For what values of k, the roots of the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ are equal?
22. The sum of first n terms of an AP is $3n^2 + 4n$. Find the 25th term of this AP.
23. Construct a tangent of a circle of radius 4 cm from a point on the concentric circle of radius 6 cm.
24. Show that the points (-2, 3), (8, 3) and (6, 7) are the vertices of a right triangle.

SECTION D

25. Water is flowing through a cylindrical pipe, of internal diameter 2 cm, into a cylindrical tank of base radius 40 cm, at the rate of 0.4 m/s. Determine the rise in level of water in the tank in half an hour.
26. A Group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (i) extremely patient (ii) extremely kind or honest. Which of the above values you prefer more?
27. A bucket open at the top, and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24 cm and the diameters of its upper and lower circular ends are 30 cm and 10 cm respectively. Find the cost of metal sheet used in it at the rate of Rs 10 per 100 cm². [Use $\pi = 3.14$]



28. In fig., l and m are two parallel tangents to a circle with centre O , touching the circle at A and B respectively. Another tangent at C intersects the line l at D and m at E . Prove that $\angle DOE = 90^\circ$



29. Sum of the areas of two squares is 400 cm². If the difference of their perimeters is 16 cm, find the sides of the two squares.



$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

31. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
32. Find the number of terms of the AP $-12, -9, -6, \dots$ 12 . If 1 is added to each term of this AP, then find the sum of all terms of the AP thus obtained.
33. Two poles of equal heights are standing opposite each other on either side of the roads, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles.
34. If the area of triangle ABC formed by $A(x,y)$, $B(1,2)$ and $C(2,1)$ is 6 square units, then prove that $x + y = 15$.

