

Time allowed : 3 hours

Maximum Marks : 80

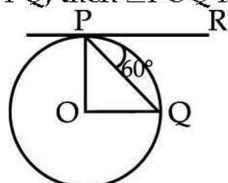
General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 10 questions of 1 mark each, Section-B comprises of 8 questions of 2 marks each, Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 6 questions of 4 marks each.
- (iii) Question numbers 1 to 10 in Section-A are multiple choice questions where you are to select one correct option out of the given four.
- (iv) There is no overall choice. However, internal choices have been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

SECTION - 'A'

Question numbers 1 to 10 carry 1 mark each. For each question, four alternative answers have been given of which only one is correct. You have to select the correct alternative.

1. $ax^2 + bx + c = 0$, $a > 0$, $b = 0$, $c > 0$ has
 (A) two equal real roots (B) one real root
 (C) two distinct real roots (D) no real roots
2. What is the common difference of an A.P. in which $a_{24} - a_{17} = -28$?
 (A) 8 (B) -8 (C) -4 (D) 4
3. If O is the centre of a circle, PQ is a chord and the tangent PR at P make an angle of 60° with PQ, then $\angle POQ$ is equal to :



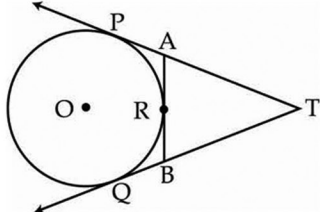
- (A) 30° (B) 120° (C) 100° (D) 110°
4. PA is a tangent to a circle from a point A with center O. Find the radius OA if $PA = 4$ cm and $OP = 5$ cm.
 (A) 2 cm (B) 3 cm (C) 1.5 cm (D) none
5. If tangents PA and PB from a point P to a circle with centre O, are inclined to each other at an angle of 80° , then $\angle POA$ is equal to
 (A) 50° (B) 60° (C) 70° (D) 80°
6. To a circle, two tangents are to be drawn which are inclined at an-angle of 70° . For that we have to draw perpendiculars to two radii which are at an angle of
 (A) 110° (B) 120° (C) 90° (D) 70°
7. A shuttle cock used for playing badminton has the shape of a combination of
 (A) a cylinder and a sphere (B) a cylinder and a hemisphere
 (C) a cone and a sphere (D) a frustum of a cone and a hemisphere
8. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then
 (A) $R_1 + R_2 = R$ (B) $R_1 + R_2 > R$
 (C) $R_1 + R_2 < R$ (D) can't say
9. A bridge, in the shape of straight path, across a river, makes an angle of 60° with the width of the river. If the length of the bridge is 100 metres, then the width of the river is
 (A) 50 m (B) 173.2 m (C) 43.3 m (D) 100 m
10. If an event occurs surely, then its probability is
 (A) 0 (B) 1 (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

SECTION - 'B'

Question numbers 11 to 18 are of 2 marks each.

11. Find the values of p for which the following equation has two equal roots :
 $(p - 12)x^2 + 2(p - 12)x + 2 = 0$

12. Determine k so that $k + 2$, $4k - 6$ and $3k - 2$ are the three consecutive terms of an A.P.
13. In the given figure, TP and TQ are tangents from T to the circle with centre O and R is any point on the circle. If AB is a tangent to the circle at R, prove that :
 $TA + AR = TB + BR$



14. If the perimeter of a semi-circular protractor is 36 cm, find the diameter of the protractor.
 (use $\pi = \frac{22}{7}$)
15. A solid metallic sphere of radius 3 cm, is melted and recast into small solid spherical balls of radius 0.3 cm. Find the number of balls formed.
16. For what value of k are the points $(1,1)$, $(3,k)$ and $(-1, 4)$ collinear ?
17. Find the coordinates of the point which divides the line segment joining the points $(1,3)$ and $(2,7)$ in the ratio of 3 : 4.
18. If there are 2 children in a family, find the probability that there is at least one boy in the family.
- OR
- Two dice are thrown together. Find the probability that a multiple of 2 occurs on one dice and a multiple of 3 occurs on the other.

SECTION - 'C'

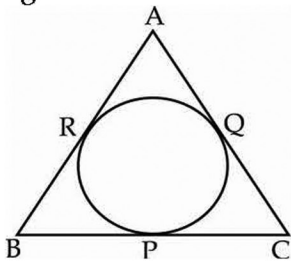
Question numbers 19 to 28 carry 3 marks each.

19. The sum of two natural numbers is 8. Find the numbers if the sum of their reciprocals is $\frac{8}{15}$.
- OR

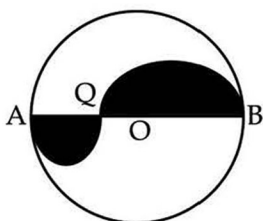
The difference of the ages of Sohrab and his father is 30 years. If the difference of the squares of their ages is 1560, find their ages.

20. If the p^{th} term of an A.P. is $\frac{1}{q}$ and the q^{th} term is $\frac{1}{p}$, show that the sum of pq terms is $\frac{(pq + 1)}{2}$.
21. AB is a diameter and AC is a chord of a circle such that $\angle BAC = 30^\circ$. If the tangent at C intersects AB produced at D, prove that $BC = BD$.
- OR

ABC is an isosceles triangle in which $AB = AC$, circumscribed about a circle, as shown in the figure. Prove that the base is bisected by the point of contact.



22. Draw a ΔABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle B = 60^\circ$. Construct a triangle $AB'C'$ such that sides of triangle $AB'C'$ are $\frac{3}{4}$ of the corresponding sides of ΔABC .
23. Find the area of the shaded region, if the diameter of the circle with centre O is 28 cm and $AQ = \frac{1}{4} AB$. (use $\pi = \frac{22}{7}$)



24. A toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of toy is 30 cm. Find the total volume of the toy. (use $\pi = \frac{22}{7}$)
- OR

If the radius of the base of a right circular cylinder is halved, keeping the height same find the ratio of the volume of the reduced cylinder to that of the original cylinder.

25. From the top of a light house, the angles of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the light house is h metres and the line joining the ships passes through the foot of the light house, show that the distance between the ships is $\frac{4}{\sqrt{3}} h$ metres.
26. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are $(0, -1)$, $(2,1)$ and $(0,3)$.
27. The point R divides the line segment AB, where $A(-4, 0)$ and $B(0,6)$ are such that $AR = \frac{3}{4} AB$. Find the coordinates of R.
28. Cards marked with numbers 5, 6, 7,, 30 are placed in a box and mixed thoroughly and one card is drawn at random from the box. What is the probability that the number on the card is
 - (i) a prime number ?
 - (ii) a multiple of 3 or 5 ?
 - (iii) neither divisible by 5 nor by 10 ?

SECTION-D

Question numbers 29 to 34 carry 4 marks each.

29. In a flight of 600 km, an aircraft was slowed down due to bad weather. The average speed for the trip was decreased by 200 km/hr. and the time of flight increased by 30 minutes. Find the duration of flight.

OR

Rs 6500 is divided equally among a certain number of persons. Had there been 15 more persons, each would have got Rs 30 less. Find the original number of persons.

30. The sum of the first 8 terms of an AP is 100 and the sum of its first 19 terms is 551. Find the first term and the common difference of the AP.
31. The radius of the in-circle of a triangle is 4 cm and the segments into which one side is divided by the point of contact are 6 cm and 8 cm. Determine the other two sides of the triangle.
32. A bucket made up of a metallic sheet is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of the bucket if the cost of metal sheet used is Rs. 15 per 100 cm^2 . (use $\pi = 3.14$)

OR

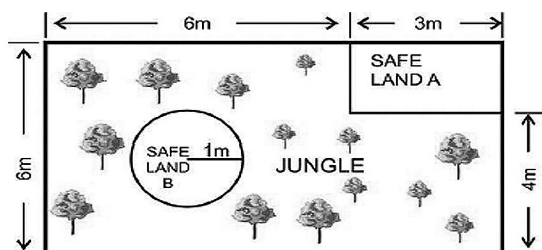
A hemispherical bowl of internal radius 15 cm contains some liquid. This liquid is to be filled in cylindrical shaped bottles of diameter 5 cm and height 6 cm. Find the number of bottles needed to empty the bowl ?

33. A gulab jamun when completely ready for eating contains sugar syrup up to about 30% of its volume. Find how much syrup would be found in 45 gulab jamuns shaped like a cylinder with two hemispherical ends, if the total length of each gulab jamun is 5 cm and its diameter is 2.8 cm.
34. The angle of elevation of an aeroplane from a point on the ground is 60° . After 15 seconds flight, the elevation changes to 30° . If the aeroplane is flying at height of $1500\sqrt{3} \text{ m}$, find the speed of the plane.

VALUE BASED QUESTIONS

2 X 5 = 10M

1. There are 3 villages A, B and C such that the distance from A to B is 7 km, from B to C is 5 km and from C to A is 8 km. The gram pradhan wants to dig a well in such a way that the distance from each villages are equal. What should be the location of well? Which value is depicted by gram pradhan?
2. Due to some default in the engine of a helicopter, a pilot has to make an emergency landing in an area as shown in the given figure.



- a. What is the probability of safe landing?
- b. What is the probability of landing in jungle?
- c. Due to bigger area, the pilot decided to land on safe land A rather than safe land B.

Which value is shown by the pilot?