



MM 90

Mathematics X

Time 3 hours

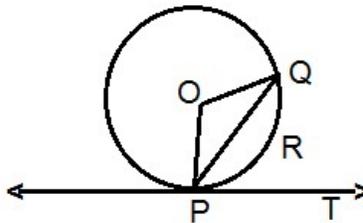
Paper Prepared by Dev Anoop (Bathinda)
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General Instructions:

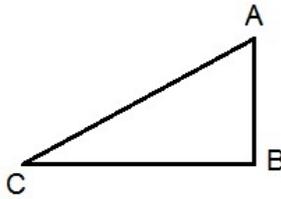
1. All questions are compulsory.
2. The question paper consists of 31 questions divided into four sections A, B, C and D.
3. Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each.
Section C contains 10 questions of 3 marks each. Section D contains 11 questions of 4 marks each.
4. Use of calculators is not permitted.

Section A - 1 Mark Each

1. If the quadratic equation $px^2 - 2\sqrt{5} px + 15 = 0$ has two equal roots, then find the value of p.
2. In figure, PQ is a chord of a circle with centre O and PT is a tangent. If $\angle QPT = 60^\circ$, find $\angle PRQ$



3. In figure, a tower AB is 20 m high and BC its shadow on the ground, is $20\sqrt{3}$ m long. Find the sun's altitude.



4. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

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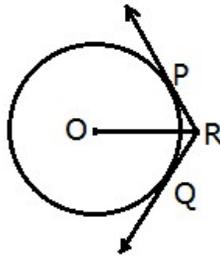
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Section B - 2 Marks Each

- The Point A (- 2, 4) lies on a circle of radius 6 cm and its centre O (3, 5). State true or false and justify your answer.
- Find the sum of two middlemost terms of the AP: $\frac{-4}{3}, -1, \frac{-2}{3}, \dots, 4\frac{1}{3}$
- In figure, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ = 120^\circ$, then prove that $OR = PR + RQ$



- Draw a circle of radius 6 cm. Take a point at a distance of 10 cm from the centre and draw a pair of tangents to the circle. Measure length of each arc.
- Solve the following quadratic equation for x: $4x^2 + 4bx - (a^2 - b^2) = 0$
- If A(4, 3), B(- 1, y) and C(3, 4) are the vertices of a right triangle ABC, right-angled at A, then find the value of y.

Section C - 3 Marks Each

- Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but of height 2.8 m, and the canvas to be used costs Rs. 100 per sq. M, find the amount, the associations will to pay. What values are shown by these associations? Use $\pi = \frac{22}{7}$

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12. The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the plane in km/hr.
13. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer.
14. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is $\frac{1}{4}$. The probability of selecting a blue ball at random from the same jar is $\frac{1}{3}$. If the jar contains 10 orange balls, find the total number of ball in the jar.
15. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per 100 sq. cm. [Use $\pi = 3.14$]
16. If the coordinates of points A and B are $(-2, -2)$ and $(2, -4)$ respectively, find the coordinates of P such that $AP = \frac{3}{7}AB$, where P lies on the line segment AB.
17. 16 glass spheres each of radius 2 cm are packed into a cuboidal box of internal dimensions 16 cm by 8 cm by 8 cm and then the box is filled with water. Find the volume of water filled in the box.
18. The area of a sector of a circle of radius 36 cm is 54π cm². Find the length of the corresponding arc of the sector.
19. Solve for x : $2x^2 + 10\sqrt{5}x - 140 = 0$
20. The 16th term of an AP is five times its third term. If its 10th term is 41, then find the sum of its first fifteen terms.

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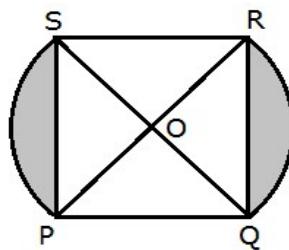
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Section D - 4 Marks Each

21. Prove that the tangent drawn at the mid-point of an arc of a circle is parallel to the chord joining the end points of the arc.
22. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30° the angle of depression of the reflection of the cloud in the lake, at A is 60° . Find the distance of the cloud from A.
23. Find the 60th term of the AP 8, 10, 12, ..., if it has a total of 60 terms and hence find the sum of its last 10 terms.
24. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is (i) a card of spade or an ace. (ii) a black king. (iii) neither a jack nor a king. (iv) either a king or a queen
25. In figure PQRS is a square lawn with side PQ = 42 metres. Two circles flower beds are there on the sides PS and QR with centre at O, the intersection of its diagonals. Find the total area of the two flower beds (shaded parts)



26. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. Use $\pi = \frac{22}{7}$
27. The diagonal of a rectangular field is 16 metres more than the shorter side. If the longer side is 14 metres more than the shorter side, then find the lengths of the sides of the field.

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28. A bus travels at a certain average speed for a distance of 75 km and then travels a distance of 90 km at an average speed of 10 km/h more than the first speed. If it takes 3 hours to complete the total journey, find its first speed.
29. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
30. Draw an isosceles ΔABC in which $AB = AC = 6$ cm and $BC = 5$ cm. Construct another triangle PQR similar to ΔABC in which $PQ = 8$ cm. Justify your construction.
31. Find the value of k so that the area of the triangle with vertices $(k + 1, 1)$, $(4, - 3)$ and $(7, - k)$ is 6 sq. Units.

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