



I. Choose the correct answer

[5 × 1 = 5]

1. Which of the following should be added to make $x^4 + 64$ a perfect square
(A) $4x^2$ (B) $16x^2$ (C) $8x^2$ (D) $-8x^2$
2. In $\triangle LMN$, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\triangle LMN \sim \triangle PQR$ then the value of $\angle R$ is
(A) 40° (B) 70° (C) 30° (D) 110°
3. A tangent is perpendicular to the radius at the
(A) centre (B) point of contact (C) infinity (D) chord
4. How many tangents can be drawn to the circle from an exterior point?
(A) one (B) two (C) infinite (D) zero
5. The two tangents from an external points P to a circle with centre at O are PA and PB . If $\angle APB = 70^\circ$ then the value of $\angle AOB$ is
(A) 100° (B) 110° (C) 120° (D) 130°

II. Answer any 5 of the following questions:

[5 × 2 = 10]

6. Find the square root of the following polynomials by division method $16x^4 + 8x^2 + 1$.
7. A vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time a tower casts a shadow 28 m long. Using similarity, find the height of the tower.
8. If $\triangle ABC \sim \triangle DEF$ such that area of $\triangle ABC$ is 9cm^2 and the area of $\triangle DEF$ is 16cm^2 and $BC = 2.1$ cm. Find the length of EF .
9. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?
10. The length of the tangent to a circle from a point P , which is 25 cm away from the centre is 24 cm. What is the radius of the circle?
11. A road is flanked on either side by continuous rows of houses of height $4\sqrt{3}$ m with no space in between them. A pedestrian is standing on the median of the road facing a row house. The angle of elevation from the pedestrian to the top of the house is 30° . Find the width of the road.
12. To a man standing outside his house, the angles of elevation of the top and bottom of a window are 60° and 45° respectively. If the height of the man is 180 cm and if he is 5 m away from the wall, what is the height of the window? ($\sqrt{3} = 1.732$)

III. Answer any 7 of the following questions:

[7 × 5 = 35]

13. Find the values of a and b if the following polynomials are perfect squares $ax^4 + bx^3 + 361x^2 + 220x + 100$
14. Find the values of m and n if the following polynomials are perfect squares $x^4 - 8x^3 + mx^2 + nx + 16$
15. Two triangles QPR and QSR , right angled at P and S respectively are drawn on the same base QR and on the same side of QR . If PR and SQ intersect at T , prove that $PT \times TR = ST \times TQ$.
16. Two vertical poles of heights 6 m and 3 m are erected above a horizontal ground AC .
Find the value of y .
17. The hypotenuse of a right triangle is 6 m more than twice of the shortest side. If the third side is 2 m less than the hypotenuse, find the sides of the triangle.
18. The perpendicular PS on the base QR of a ΔPQR intersects QR at S , such that $QS = 3 SR$. Prove that $2PQ^2 = 2PR^2 + QR^2$.
19. ΔLMN is a right angled triangle with $\angle L = 90^\circ$. A circle is inscribed in it. The lengths of the sides containing the right angle are 6 cm and 8 cm. Find the radius of the circle.
20. Two circles with centres O and O' of radii 3 cm and 4 cm, respectively intersect at two points P and Q , such that OP and $O'P$ are tangents to the two circles. Find the length of the common chord PQ .
21. A flag pole ' h ' metres is on the top of the hemispherical dome of radius ' r ' metres. A man is standing 7 m away from the dome. Seeing the top of the pole at an angle 45° and moving 5 m away from the dome and seeing the bottom of the pole at an angle 30° . Find
(i) the height of the pole
(ii) radius of the dome ($\sqrt{3} = 1.732$)
22. The top of a 15 m high tower makes an angle of elevation of 60° with the bottom of an electronic pole and angle of elevation of 30° with the top of the pole. What is the height of the electric pole?

