Assignment 1

EE24Btech11022 - Eshan sharma

B: True/False

1. No tangent can be drawn from point $(5/2, 1)$ to circumcircle of triangle with vertices $(1, \sqrt{3})$, $(1, -\sqrt{3})$, and $(3, -\sqrt{3})$. (1985 - 1 mark)
2. The line x+3y = 0 is a diameter of the circle

$$x^2 + y^2 - 6x + 2y = 0$$

(1989 - 1 mark)

C: MCQs with One Correct Answer

1. A square is inscribed in the circle

$$x^2 + y^2 - 2x + 4y + 3 = 0.$$

Its sides are parellel to the coordinate axes. The one vertex of the square is (1980)

(a) $(1 + \sqrt{2}, -2)$
(b) $(1 - \sqrt{2}, -2)$
(c) $(1, -2 + \sqrt{2})$
(d) none of these

2. Two circles $x^2+y^2 = 6$ and $x^2+y^2-6x+8 = 0$ are given. Then the equation of the circle through their points of intersection and the point (1,1) is (1980)

(a) $x^2 + y^2 - 6x + 4 = 0$
(b) $x^2 + y^2 - 3x + 1 = 0$
(c) $x^2 + y^2 - 4y + 2 = 0$
(d) none of these

3. The centre of the circle passing through the point (0,1) and touching the curve y = x^2 at (2,4). (1983 - 1 mark)

(a) $\left(\frac{-16}{5}, \frac{27}{10}\right)$
(b) $\left(\frac{-16}{7}, \frac{53}{10}\right)$
(c) $\left(\frac{-16}{5}, \frac{53}{10}\right)$
(d) none of these

4. The equation of circle passing through (1,1) and points of intersection of $x^2+y^2+13x-3y = 0$ and $2x^2 + 2y^2 + 4x - 7y - 25 = 0$ is (1983 - 1 mark)

(a) $4x^2 + 4y^2 - 30x - 10y - 25 = 0$
(b) $4x^2 + 4y^2 + 30x - 13y - 25 = 0$
(c) $4x^2 + 4y^2 - 17x - 10y + 25 = 0$
(d) none of these

5. The locus of the midpoint of a chord of the circle $x^2 + y^2 = 4$ which subtends a right angle at the origin is (1984 - 2 mark)

(a) x+y=2
(b) $x^2 + y^2 = 1$
(c) $x^2 + y^2 = 2$
(d) x+y=1

6. If a circle passes through the point (a,b) and cuts the circle $x^2 + y^2 = k^2$ orthogonally, then the equation of the locus of its centre is (1988 - 2 mark)

(a) 2ax + 2by - $(a^2 + b^2 + k^2) = 0$
(b) 2ax + 2by - $(a^2 - b^2 + k^2) = 0$
(c) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - k^2) = 0$
(d) $x^2 + y^2 - 2ax - 3by + (a^2 - b^2 - k^2) = 0$

7. If the two circles $(x - 1)^2 + (y - 3)^2 = r^2$ and $x^2+y^2-8x+2y+8 = 0$ intersect in two distinct points, then (1989 - 2 mark)

(a) $2 < r < 8$
(b) $r < 2$
(c) $r = 2$
(d) $r > 2$

8. the lines 2x-3y=5 and 3x-4y=7 are diameters of a circle of area 154 sq. units. The equation of this circle is (1989 - 2 mark)

(a) $x^2 + y^2 + 2x - 2y = 62$
(b) $x^2 + y^2 + 2x - 2y = 47$
(c) $x^2 + y^2 - 2x + 2y = 47$
(d) $x^2 + y^2 - 2x + 2y = 62$

9. The centre of the circle passing through the points (0,0),(1,0) and touching the circle $x^2 + y^2 = 9$ is (1992 - 1 mark)

(a) $\left(\frac{3}{2}, \frac{1}{2}\right)$
(b) $\left(\frac{1}{2}, \frac{3}{2}\right)$
(c) $\left(\frac{1}{2}, -2\frac{1}{2}\right)$
(d) none of these

10. The locus of the centre of a circle, which touches the circle is $x^2 + y^2 - 6x - 6y + 14 = 0$

and also touches the y-axis, is given by the equation: (1993 - 1 mark)

(a) $x^2 - 6x - 10y + 14 = 0$
(b) $x^2 - 10x - 6y + 14 = 0$
(c) $y^2 - 6x - 10y + 14 = 0$
(d) $y^2 - 10x - 6y + 14 = 0$

11. The circles $x^2 - 10x + 16 = 0$ and $x^2 + y^2 = r^2$ intersect each other in the two distinct points if (1994)

(a) $r < 2$
(b) $r > 8$
(c) $2 < r < 8$
(d) $2 \leq r \leq 8$

12. The angle between the pair of tangents drawn from the point P to the circle $x^2 + y^2 + 4x - 6y + 9sin^2\alpha + 13cos^2\alpha = 0$ is 2α. The equation of the locus of the point P is (1996 - 1 mark)

(a) $x^2 + y^2 + 4x - 6y + 4 = 0$
(b) $x^2 + y^2 + 4x - 6y - 9 = 0$
(c) $x^2 + y^2 + 4x - 6y - 4 = 0$
(d) $x^2 + y^2 + 4x - 6y + 9 = 0$

13. If two distinct chords, drawn from the point (p,q) on the circle $x^2 + y^2 = px + qy$ (where pq $\neq 0$) are bisected by the x-axis, then which are true (1999 - 1 mark)

(a) $p^2 = q^2$
(b) $p^2 = 8q^2$
(c) $p^2 < 8q^2$
(d) $p^2 > 8q^2$