Circles

EE24Btech11022 - Eshan sharma

I. True/False

1) No tangent can be drawn from point $(5/2, 1)$ to circumcircle of triangle with vertices $\left(1, \sqrt{3}\right)$, $\left(1, -\sqrt{3}\right)$, and $\left(3, -\sqrt{3}\right)$. (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)

II. 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) $\left(1 + \sqrt{2}, -2\right)$
   b) $\left(1 - \sqrt{2}, -2\right)$
   c) $\left(1, -2 + \sqrt{2}\right)$
   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 the circles $x^2+y^2+13x - 3y = 0$ 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 is passing through the point (a, b) and it is cutting 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 $x^2+y^2+4x-6y+9\sin^2\alpha + 13\cos^2\alpha = 0$ 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) $p^2 > 8q^2$