1. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = 4$ orthogonally, then the locus of its centre is- **[AIEEE-2004]**

(1) $2ax + 2by + (a^2 + b^2 + 4) = 0$

(2) $2ax + 2by - (a^2 + b^2 + 4) = 0$

(3) $2ax - 2by + (a^2 + b^2 + 4) = 0$

(4) $2ax - 2by - (a^2 + b^2 + 4) = 0$

2. A variable circle passes through the fixed point A(p, q) and touches x-axis. The locus of the other end of the diameter through A is- **[AIEEE-2004]**

(1) $(x - p)^2 = 4qy$ (2) $(x - q)^2 = 4py$

(3) $(y - p)^2 = 4qx$ (4) $(y - q)^2 = 4px$

3. If the lines $2x + 3y + 1 = 0$ and $3x - y - 4 = 0$ lie along diameters of a circle of circumference 10π, then the equation of the circle is- **[AIEEE-2004]**

(1) $x^2 + y^2 - 2x + 2y - 23 = 0$

(2) $x^2 + y^2 - 2x - 2y - 23 = 0$

(3) $x^2 + y^2 + 2x + 2y - 23 = 0$

(4) $x^2 + y^2 + 2x - 2y - 23 = 0$

4. The intercept on the line $y = x$ by the circle $x^2 + y^2 - 2x = 0$ is AB. Equation of the circle on AB as a diameter is- **[AIEEE-2004]**

(1) $x^2 + y^2 - x - y = 0$

(2) $x^2 + y^2 - x + y = 0$

(3) $x^2 + y^2 + x + y = 0$

(4) $x^2 + y^2 + x - y = 0$

5. If the circles $x^2 + y^2 + 2ax + cy + a = 0$ and $x^2 + y^2 - 3ax + dy - 1 = 0$ intersect in two distinct point P and Q then the line $5x + by - a = 0$ passes through P and Q for- **[AIEEE-2005]**

(1) exactly one value of a

(2) no value of a

(3) infinitely many values of a

(4) exactly two values of a

6. A circle touches the x-axis and also touches the circle with centre at (0, 3) and radius 2. The locus of the centre of the circle is- **[AIEEE-2005]**

(1) an ellipse (2) a circle

(3) a hyperbola (4) a parabola

7. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = p^2$ orthogonally, then the equation of the locus of its centre is- **[AIEEE-2005]**

(1) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - p^2) = 0$

(2) $2ax + 2by - (a^2 - b^2 + p^2) = 0$

(3) $x^2 + y^2 - 2ax - 3by + (a^2 - b^2 - p^2) = 0$

(4) $2ax + 2by - (a^2 + b^2 + p^2) = 0$

8. If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sector then- **[AIEEE-2005]**

(1) $3a^2 - 10ab + 3b^2 = 0$

(2) $3a^2 - 2ab + 3b^2 = 0$

(3) $3a^2 + 10ab + 3b^2 = 0$

(4) $3a^2 + 2ab + 3b^2 = 0$

9. Let C be the circle with centre (0, 0) and radius 3 units. The equation of the locus of the mid points of the chords of the circle C that subtend an angle of $\frac{2\pi}{3}$ at its centre is- **[AIEEE-2006, IIT-1996]**

(1) $x^2 + y^2 = 1$ (2) $x^2 + y^2 = \frac{27}{4}$

(3) $x^2 + y^2 = \frac{9}{4}$ (4) $x^2 + y^2 = \frac{3}{2}$

10. Consider a family of circles which are passing through the point (–1, 1) and are tangent to x-axis. If (h, k) are the co-ordinates of the centre of the circles, then the set of values of k is given by the interval- **[AIEEE-2007]**

(1) $0 < k < 1/2$ (2) $k \geq 1/2$

(3) $-1/2 \leq k \leq 1/2$ (4) $k \leq 1/2$

11. The point diametrically opposite to the point (1, 0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is- **[AIEEE-2008]**

(1) (3, –4) (2) (–3, 4) (3) (–3, –4) (4) (3, 4)

12. Three distinct points A, B and C are given in the 2–dimensional coordinate plane such that the ratio of the distance of any one of them from the point (1, 0) to the distance from the point (–1, 0) is equal to $\frac{1}{3}$. Then the circumcentre of the triangle ABC is at the point :- **[AIEEE-2009]**

(1) $\left(\frac{5}{2}, 0\right)$ (2) $\left(\frac{5}{3}, 0\right)$ (3) (0, 0) (4) $\left(\frac{5}{4}, 0\right)$

13. If P and Q are the points of intersection of the circles $x^2 + y^2 + 3x + 7y + 2p - 5 = 0$ and $x^2 + y^2 + 2x + 2y - p^2 = 0$, then there is a circle passing through P, Q and (1, 1) for :-

[AIEEE-2009]

(1) All except two values of p

(2) Exactly one value of p

(3) All values of p

(4) All except one value of p

14. For a regular polygon, let r and R be the radii of the inscribed and the circumscribed circles. A false statement among the following is :-

[AIEEE-2010]

(1) There is a regular polygon with $\frac{r}{R} = \frac{1}{2}$

(2) There is a regular polygon with $\frac{r}{R} = \frac{1}{\sqrt{2}}$

(3) There is a regular polygon with $\frac{r}{R} = \frac{2}{3}$

(4) There is a regular polygon with $\frac{r}{R} = \frac{\sqrt{3}}{2}$

15. The circle $x^2 + y^2 = 4x + 8y + 5$ intersects the line $3x - 4y = m$ at two distinct points if :-

[AIEEE-2010]

(1) $-85 < m < -35$ (2) $-35 < m < 15$

(3) $15 < m < 65$ (4) $35 < m < 85$

16. The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2$ $(c > 0)$ touch each other if :- **[AIEEE-2011]**

(1) $a = 2c$ (2) $|a| = 2c$

(3) $2|a| = c$ (4) $|a| = c$

17. The equation of the circle passing through the points (1, 0) and (0, 1) and having the smallest radius is-

[AIEEE-2011]

(1) $x^2 + y^2 + x + y - 2 = 0$

(2) $x^2 + y^2 - 2x - 2y + 1 = 0$

(3) $x^2 + y^2 - x - y = 0$

(4) $x^2 + y^2 + 2x + 2y - 7 = 0$

18. The length of the diameter of the circle which touches the x-axis at the point (1, 0) and passes through the point (2, 3) is : **[AIEEE-2012]**

(1) 5/3 (2) 10/3

(3) 3/5 (4) 6/5

19. The circle passing through (1, – 2) and touching the axis of x at (3, 0) also passes through the point :

[JEE (Main)-2013]

(1) (–5, 2) (2) (2, –5) (3) (5, –2) (4) (–2, 5)

20. If a circle C passing through (4, 0) touches the circle $x^2 + y^2 + 4x - 6y - 12 = 0$ externally at a point (1, –1), then the radius of the circle C is :-

[JEE-Main (on line)-2013]

(1) $\sqrt{57}$ (2) $2\sqrt{5}$ (3) 4 (4) 5

21. If the circle $x^2 + y^2 - 6x - 8y + (25 - a^2) = 0$ touches the axis of x, then a equals :-

[JEE-Main (on line)-2013]

(1) ±4 (2) ±3 (3) 0 (4) ±2

22. The radius of a circle, having minimum area, which touches the curve $y = 4 - x^2$ and the lines, $y = |x|$ is :- **[JEE(Main)-2017]**

(1) $4\left(\sqrt{2}+1\right)$ (2) $2\left(\sqrt{2}+1\right)$

(3) $2\left(\sqrt{2}-1\right)$ (4) $4\left(\sqrt{2}-1\right)$

23. The radius of the circle, having centre at (2, 1), whose one of the chord is a diameter of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ **[IIT 2004 (Scr)]**

(1) 1 (2) 2 (3) 3 (4) $\sqrt{3}$

24. Line $2x + 3y + 1 = 0$ is a tangent to a circle at (1, –1). This circle is orthogonal to a circle which is drawn having diameter as a line segment with end points (0, –1) and (– 2, 3). Find equation of circle.

[IIT 2004]

(1) $2x^2 + 2y^2 - 10x - 5y + 1 = 0$

(2) $x^2 + y^2 - 10x - 5y + 1 = 0$

(3) $x^2 + y^2 - 5x - 5y + 1 = 0$

(4) $2x^2 + 2y^2 - 5x - 5y + 1 = 0$

25. A circle is given by $x^2 + (y - 1)^2 = 1$, another circle C touches it externally and also the x-axis, then the locus of its centre is **[IIT 2005 (Scr)]**

(1) $\{(x, y) : x^2 = 4y\} \cup \{(x, y) : y \le 0\}$

(2) $\{(x, y) : x^2 + (y - 1)^2 = 4\} \cup \{x, y) : y \le 0\}$

(3) $\{(x, y) : x^2 = y\} \cup \{(0, y) : y \le 0\}$

(4) $\{(x, y) : x^2 = 4y\} \cup \{(0, y) : y \le 0\}$

26. Let ABCD be a quadrilateral with area 18, with side AB parallel to the side CD and AB = 2CD. Let AD be perpendicular to AB and CD. If a circle is drawn inside the quadrilateral ABCD touching all the sides, then its radius is

[IIT 2007]

(1) 3 (2) 2 (3) 3/2 (4) 1

27. Tangents drawn from the point P(l, 8) to the circle $x^2 + y^2 - 6x - 4y - 11 = 0$ touch the circle at the points A and B. The equation of the circumcircle of the triangle PAB is **[IIT 2009]**

(1) $x^2 + y^2 + 4x - 6y + 19 = 0$

(2) $x^2 + y^2 - 4x - 10y + 19 = 0$

(3) $x^2 + y^2 - 2x + 6y - 29 = 0$

(4) $x^2 + y^2 - 6x - 4y + 19 = 0$

28. The circle passing through the point (–1,0) and touching the y-axis at (0,2) also passes through the point - **[IIT 2011]**

(1) $\left(-\frac{3}{2},0\right)$ (2) $\left(-\frac{5}{2},2\right)$

(3) $\left(-\frac{3}{2},\frac{5}{2}\right)$ (4) (–4,0)

29. The straight line 2x – 3y = 1 divides the circular region $x^2 + y^2 \le 6$ into two parts. If

$$S = \left\{\left(2,\frac{3}{4}\right),\left(\frac{5}{2},\frac{3}{4}\right),\left(\frac{1}{4},-\frac{1}{4}\right),\left(\frac{1}{8},\frac{1}{4}\right)\right\},$$

then the number of point(s) in S lying inside the smaller part is :- **[IIT-2011]**

(1) 1 (2) 2

(3) 3 (4) 4

30. The locus of the mid-point of the chord of contact of tangents drawn from points lying on the straight line 4x – 5y = 20 to the circle $x^2 + y^2 = 9$ is- **[IIT 2012]**

(1) $20(x^2 + y^2) - 36x + 45y = 0$

(2) $20(x^2 + y^2) + 36x - 45y = 0$

(3) $36(x^2 + y^2) - 20x + 45y = 0$

(4) $36(x^2 + y^2) + 20x - 45y = 0$

PREVIOUS YEARS QUESTIONS				ANSWER KEY						Exercise-II
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**2**	**1**	**1**	**1**	**2**	**4**	**4**	**4**	**3**	**2**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**3**	**4**	**4**	**3**	**2**	**4**	**3**	**2**	**3**	**4**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**4**	**3**	**1**	**4**	**2**	**2**	**4**	**2**	**1**