CIRCLE SYSTEM ASSIGNMENT - III

1. The line *L* passes through the points of intersection of the circles $x^2+y^2=25$ and $x^2+y^2-8x+7=0$. The length of perpendicular from centre of second circle onto the line *L*, is

(a) 4 (b) 3 (c) 1 (d) 0

2. The common chord of $x^2+y^2-4x-4y=0$ and $x^2+y^2=16$ subtends at the origin an angle equal to

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

3. The length of the common chord of the circles $(x-a)^2+(y-b)^2=c^2$ and $(x-b)^2+(y-a)^2=c^2$ is

(a) $\sqrt{c^2-(a-b)^2}$ (b) $\sqrt{4c^2-2(a-b)^2}$ (c) $\sqrt{2c^2-(a-b)^2}$ (d) $\sqrt{4c^2+(a-b)^2}$

4. If the circles $(x-a)^2+(y-b)^2=c^2$ and $(x-b)^2+(y-a)^2=c^2$ touch each other, then

(a) $a=b\pm 2c$ (b) $a=b\pm\sqrt{2}c$ (c) $a=b\pm c$ (d) None of these

5. If the circle $c_1: x^2+y^2=16$ intersects another circle c_2 of radius 5 in such a manner that the common chord is of maximum length and has a slope equal to 3/4, the coordinates of the centre of c_2 are

(a) $\left(-\frac{9}{5},\frac{12}{5}\right),\left(\frac{9}{5},-\frac{12}{5}\right)$ (b) $\left(-\frac{9}{5},-\frac{12}{5}\right),\left(\frac{9}{5},\frac{12}{5}\right)$ (c) $\left(\frac{12}{5},-\frac{9}{5}\right),\left(-\frac{12}{5},\frac{9}{5}\right)$ (d) None of these

6. The common chord of the circle $x^2+y^2+6x+8y-7=0$ and a circle passing through the origin, and touching the line $y=x$, always passes through the point

(a) (– 1/2, 1/2) (b) (1, 1) (c) (1/2, 1/2) (d) None of these

7. The equation of the circle drawn on the common chord of circles $x^2+y^2+2ax+c=0$ and $x^2+y^2+2by+c=0$ as a diameter is

(a) $x^2+y^2+\frac{2ab^2}{a^2+b^2}x+\frac{2a^2b}{a^2+b^2}y+c=0$ (b) $x^2+y^2+\frac{ab^2}{a^2+b^2}x+\frac{a^2b}{a^2+b^2}y+c=0$

(c) $(a^2+b^2)(x^2+y^2)+2ab(bx+ay)+c=0$ (d) None of these

8. The equation of the circle drawn on the common chord of circles $(x-a)^2+y^2=a^2$ and $x^2+(y-b)^2=b^2$ as diameter is

(a) $(a^2+b^2)(x^2+y^2)=2ab(bx+ay)$ (b) $(a^2+b^2)(x^2+y^2)=2ab(ax+by)$

(c) $(a^2-b^2)(x^2+y^2)=2ab(bx-ay)$ (d) $(a^2-b^2)(x^2+y^2)=2ab(ax-by)$

9. The equation of a circle which cuts the three circles $x^2+y^2-3x-6y+14=0$, $x^2+y^2-x-4y+8=0$ and $x^2+y^2+2x-6y+9=0$ orthogonally is

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

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

10. The coordinates of the centre of the circle which intersects circles $x^2+y^2+4x+7=0$, $2x^2+2y^2+3x+5y+9=0$ and $x^2+y^2+y=0$ orthogonally are

(a) (– 2, 1) (b) (–2, –1) (c) (2, – 1) (d) (2, 1)

11. The members of a family of circles are given by the equation $2(x^2+y^2)+\lambda x-(1+\lambda^2)y-10=0$. The number of circles belonging to the family that are cut orthogonally by the fixed circle $x^2+y^2+4x+6y+3=0$ is

(a) 2 (b) 1 (c) 0 (d) None of these

12. If the radical axis of the circles $x^2+y^2+2gx+2fy+c=0$ and $2x^2+2y^2+3x+8y+2c=0$ touches the circle $x^2+y^2+2x+2y+1=0$, then

(a) $g=\frac{3}{4}$ and $f\neq 2$ (b) $g\neq\frac{3}{4}$ and $f=2$ (c) $g=\frac{3}{4}$ and $f=2$ (d) None of these

13. If (1, 2) is the radical centre of circle $x^2+y^2-3x-6y+d_1=0$, $x^2+y^2-x-4y+d_2=0$ and $x^2+y^2+2x-6y+d_3=0$, then

(a) $d_1+d_3=5$ (b) $d_1-d_3=5$ (c) $d_1+d_3=10$ (d) $d_1-d_3=10$

14. $x=1$ is the equation of the radical axis of two circle which intersect orthogonally. If the equation of one of these circles is $x^2+y^2=4$, then the equation of the other is

(a) $x^2+y^2-8x-4=0$ (b) $x^2+y^2-8x+4=0$ (c) $x^2+y^2+8x+4=0$ (d) None of these

15. One of the limiting point of the coaxial system of circles containing $x^2+y^2-6x-6y+4=0,\ x^2+y^2-2x-4y+3=0$ is
(a) (– 1, 1) (b) (– 1, 2) (c) (– 2, 1) (d) (– 2, 2)

16. The co-axial system of circles given by $x^2+y^2+2gx+c=0$ for $c<0$ represents.
(a) Intersecting circles (b) Non intersecting circles
(c) Touching circles (d) Touching or non-intersecting circles

17. If the points (2, 0), (0, 1), (4, 5) and (0, c) are concyclic, then *c* is equal to
(a) $-1, -\frac{3}{14}$ (b) $-1, -\frac{14}{3}$ (c) $\frac{14}{3}, 1$ (d) None of these

18. Line $Ax+By+C=0$ cuts circle $x^2+y^2+ax+by+c=0$ in *P* and *Q* and the line $A'x+B'y+C'=0$ cuts the circle $x^2+y^2+a'x+b'y+c'=0$ in *R* and *S*. If the four points *P, Q, R* and *S* are concyclic, then

$$D=\begin{vmatrix} a-a' & b-b' & C-C' \\ A & B & c \\ A' & B' & c' \end{vmatrix}=$$

(a) 1 (b) 0 (c) – 1 (d) None of these

19. A circle is inscribed in an equilateral triangle of side *a*, the area of any square inscribed in the circle is
(a) $\frac{a^2}{3}$ (b) $\frac{2a^2}{3}$ (c) $\frac{a^2}{6}$ (d) $\frac{a^2}{12}$

20. Any circle through the points of intersection of the lines $x+\sqrt{3}y=1$ and $\sqrt{3}x-y=2$ if intersects these lines at points *P* and *Q*, then the angle subtended by the arc *PQ* at its centre is
(a) 180^o (b) 90^o (c) 120^o (d) Depends on centre of radius

21. The area of the triangle formed by joining the origin to the points of intersection of the line $x\sqrt{5}+2y=3\sqrt{5}$ and circle $x^2+y^2=10$ is
(a) 3 (b) 4 (c) 5 (d) 6

22. Let *AB* be a chord of the circle $x^2+y^2=r^2$ subtending a right angle at the centre. Then the locus of the centroid of the ΔPAB as *P* moves on the circle is
(a) A parabola (b) A circle (c) An ellipse (d) A pair of straight lines

23. A square is inscribed in the circle $x^2+y^2-2x+4y-93=0$ with its sides parallel to the coordinate axes. The coordinates of its vertices are
(a) (– 6, – 9), (– 6, 5), (8, – 9), (8, 5) (b) (– 6, 9), (– 6, – 5), (8, – 9), (8, 5)
(c) (– 6, – 9), (– 6, 5), (8, 9), (8, 5) (d) (– 6, – 9), (– 6, 5), (8, – 9), (8, – 5)

24. If the lines $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ cut the coordinate axes in concyclic points, then
(a) $a_1a_2=b_1b_2$ (b) $a_1b_1=a_2b_2$ (c) $a_1b_2=a_2b_1$ (d) None of these

25. Let *P* be a point on the circle $x^2+y^2=9$, Q a point on the line $7x+y+3=0$, and the perpendicular bisector of *PQ* be the line $x-y+1=0$. Then the coordinates of *P* are
(a) (3, 0) (b) (0, 3) (c) $\left(\frac{72}{25}, -\frac{21}{25}\right)$ (d) $\left(-\frac{72}{25}, \frac{21}{25}\right)$

26. A line meets the coordinate axes in *A* and *B*. A circle is circumscribed about the triangle *OAB*. The distances from the end points *A, B* of the side *AB* to the tangent at *O* are equal to *m* and *n* respectively. Then the diameter of the circle is
(a) $m(m+n)$ (b) $n(m+n)$ (c) $m-n$ (d) None of these

27. If the circle $x^2+y^2+2gx+2fy+c=0$ is touched by $y=x$ at *P* such that $OP=6\sqrt{2}$, then the value of *c* is
(a) 36 (b) 144 (c) 72 (d) None of these

28. One of the diameters of the circle circumscribing the rectangle *ABCD* is $4y=x+7$. If *A* and *B* are the points (–3, 4) and (5, 4) respectively, then the area of the rectangle is
(a) 16 sq. units (b) 24 sq. units (c) 32 sq. units (d) None of these

29. The maximum number of points with rational coordinates on a circle whose centre is $(\sqrt{3}, 0)$ is
(a) One (b) Two (c) Four (d) Infinite

30. The locus of co-ordinates of the centre of the circumcircle of the regular hexagon whose two consecutive vertices have the coordinates (–1, 0) and (1, 0) and which lies wholly above the *x*-axis, are
(a) $x^2+y^2-2\sqrt{3}y-1=0$ (b) $x^2+y^2-\sqrt{3}y-1=0$ (c) $x^2+y^2-2\sqrt{3}x-1=0$ (d) None of these

31. For each $k \in N$, let C_k denote the circle whose equation is $x^2+y^2=k^2$. On the circle C_k, a particle moves *k* units in the anticlockwise direction. After completing its motion on C_k, the particle moves to C_{k+1} in the radial direction. The motion of the particle continues in this manner. The particle starts at (1, 0). If the particle crosses the positive direction of the *x*-axis for the first time on the circle C_n, then *n* is
(a) 7 (b) 6 (c) 2 (d) None of these

32. A ray of light incident at the point (– 2, – 1) gets reflected from the tangent at (0, – 1) to the circle $x^2 + y^2 = 1$. The reflected ray touches the circle. The equation of the line along which the incident ray moved is

(a) $4x - 3y + 11 = 0$ (b) $4x + 3y + 11 = 0$ (c) $3x + 4y + 11 = 0$ (d) None of these

33. The point *P* moves in the plane of a regular hexagon such that the sum of the squares of its distances from the vertices of the hexagon is $6a^2$. If the radius of the circumcircle of the hexagon is $r(< a)$ then the locus of *P* is

(a) A pair of straight lines (b) An ellipse

(c) A circle of radius $\sqrt{a^2 - r^2}$ (d) An ellipse of major axis *a* and minor axis *r*

34. The equation of a circle is $x^2 + y^2 = 4$. A regular hexagon is inscribed in the circle whose one vertex is (2, 0). Then a consecutive vertex has the coordinates

(a) $(\sqrt{3}, 1)$ (b) $(1, -\sqrt{3})$ (c) $(\sqrt{3}, -1)$ (d) $(1, \sqrt{3})$

35. A point $P(\sqrt{3}, 1)$ moves on the circle $x^2 + y^2 = 4$ and after covering a quarter of the circle leaves it tangentially. The equation of a line along which the point moves after leaving the circle is

(a) $y = \sqrt{3}x + 4$ (b) $\sqrt{3}y = x + 4$ (c) $\sqrt{3}y = x - 4$ (d) $y = \sqrt{3}x - 4$

36. If the curves $ax^2 + 4xy + 2y^2 + x + y + 5 = 0$ and $ax^2 + 6xy + 5y^2 + 2x + 3y + 8 = 0$ intersect at four concyclic points then the value of *a* is

(a) 4 (b) – 4 (c) 6 (d) – 6

37. If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ bisects the circumference of the circle $x^2 + y^2 + 2g'x + 2f'y + c' = 0$, then

(a) $2g(g - g') + 2f(f - f') = c - c'$ (b) $2g'(g - g') + 2f'(f - f') = c' - c$

(c) $2g'(g - g') + 2f'(f - f') = c - c'$ (d) $2g(g - g') + 2f(f - f') = c' - c.$

38. If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ bisects the circumference of the circle $x^2 + y^2 + 2g'x + 2f'y + c' = 0$, then the length of the common chord of these two circles is

(a) $2\sqrt{g^2 + f^2 - c}$ (b) $2\sqrt{g'^2 + f'^2 - c'}$ (c) $2\sqrt{g^2 + f^2 + c}$ (d) $2\sqrt{g'^2 + f'^2 + c'}$

39. The equation of the circle described on the common chord of the circles $x^2 + y^2 + 2x = 0$ and $x^2 + y^2 + 2y = 0$ as diameter is

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

40. The distance of the point (1, 2) from the common chord of circles $x^2 + y^2 - 2x + 3y - 5 = 0$ and $x^2 + y^2 + 10x + 8y - 1 = 0$ is

(a) 2 units (b) 3 units (c) 4 units (d) None of these

41. If the centre of a circle which passing through the points of intersection of the circles $x^2 + y^2 - 6x + 2y + 4 = 0$ and $x^2 + y^2 + 2x - 4y - 6 = 0$ is on the line $y = x$, then the equation of the circle is

(a) $7x^2 + 7y^2 - 10x + 10y - 11 = 0$ (b) $7x^2 + 7y^2 + 10x - 10y - 12 = 0$

(c) $7x^2 + 7y^2 - 10x - 10y - 12 = 0$ (d) $7x^2 + 7y^2 - 10x - 12 = 0$

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

(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

43. The equation of circle passes through the points of intersection of circles $x^2 + y^2 - 6x + 8 = 0$ and $x^2 + y^2 = 6$ and point (1, 1) is

(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

44. The equation of the circle having its centre on the line $x + 2y - 3 = 0$ and passing through the points of intersection of the circles $x^2 + y^2 - 2x - 4y + 1 = 0$ and $x^2 + y^2 - 4x - 2y + 4 = 0$, is

(a) $x^2 + y^2 - 6x + 7 = 0$ (b) $x^2 + y^2 - 3y + 4 = 0$ (c) $x^2 + y^2 - 2x - 2y + 1 = 0$ (d) $x^2 + y^2 + 2x - 4y + 4 = 0$

45. A circle of radius 5 touches another circle $x^2 + y^2 - 2x - 4y - 20 = 0$ at (5, 5), then its equation is

(a) $x^2 + y^2 + 18x + 16y + 120 = 0$ (b) $x^2 + y^2 - 18x - 16y + 120 = 0$

(c) $x^2 + y^2 - 18x + 16y + 120 = 0$ (d) None of these

46. The points of intersection of circles $x^2 + y^2 = 2ax$ and $x^2 + y^2 = 2by$ are

(a) (0, 0), (*a, b*) (b) (0, 0), $\left(\frac{2ab^2}{a^2+b^2}, \frac{2ba^2}{a^2+b^2}\right)$ (c) (0, 0), $\left(\frac{a^2+b^2}{a^2}, \frac{a^2+b^2}{b^2}\right)$ (d) None of these

47. The distance between the chords of contact of the tangent to the circle $x^2+y^2+2gx+2fy+c=0$ from the origin and the point (*g, f*) is

(a) g^2+f^2 (b) $\frac{1}{2}(g^2+f^2+c)$ (c) $\frac{1}{2}.\frac{g^2+f^2+c}{\sqrt{g^2+f^2}}$ (d) $\frac{1}{2}.\frac{g^2+f^2-c}{\sqrt{g^2+f^2}}$

48. If the straight line $x-2y+1=0$ intersects the circle $x^2+y^2=25$ in points *P* and *Q*, then the coordinates of the point of intersection of tangents drawn at *P* and *Q* to the circle $x^2+y^2=25$ are

(a) (25, 50) (b) (– 25, – 50) (c) (– 25, 50) (d) (25, – 50)

49. If the chord of contact of tangents drawn from the point (*h, k*) to the circle $x^2+y^2=a^2$ subtends a right angle at the centre, then

(a) $h^2+k^2=a^2$ (b) $2(h^2+k^2)=a^2$ (c) $h^2-k^2=a^2$ (d) $h^2+k^2=2a^2$

50. The chord of contact of the pair of tangents drawn from each point on the line $2x+y=4$ to the circle $x^2+y^2=1$ pass through the point

(a) (1/2, – 1/4) (b) (1/2, 1/4) (c) (– 1/2, 1/4) (d) (– 1/2, – 1/4)