PAIR OF STRAIGHT LINE ASSIGNMENT

1. The equation $\sqrt{(x-2)^2+y^2}+\sqrt{(x+2)^2+y^2}=4$ represents a

(a) Circle (b) Pair of straight lines (c) Parabola (d) Ellipse

2. The locus of the point $P(x,y)$ satisfying the relation $\sqrt{(x-3)^2+(y-1)^2}+\sqrt{(x+3)^2+(y-1)^2}=6$ is a

(a) Straight line (b) Pair of straight lines (c) Circle (d) Ellipse

3. If the equation $12x^2+7xy-py^2-18x+qy+6=0$ represents a pair of perpendicular straight lines, then

(a) $p=12,\ q=1$ (b) $p=1, q=12$ (c) $p=-1, q=12$ (d) $p=1, q=-12$

4. The equation of the pair of straight lines parallel to *x*-axis and touching the circle $x^2+y^2-6x-4y-12=0$ is

(a) $y^2-4y-21=0$ (b) $y^2+4y-21=0$ (c) $y^2-4y+21=0$ (d) $y^2+4y+21=0$

5. Two pairs of straight lines have the equations $y^2+xy-12x^2=0$ and $ax^2+2hxy+by^2=0$. One line will be common among them if

(a) $a=-3(2h+3b)$ (b) $a=8(h-2b)$ (c) $a=2(b+h)$ (d) $a=-3(b+h)$

6. If $u\equiv a_1x+b_1y+c_1=0,\ v\equiv a_2x+b_2y+c_2=0$ and $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$, then curve $u+kv=0$ is

(a) A line represented by *u* (b) A different line (c) Not a line (d) None of these

7. If one of the line represented by the equation $ax^2+2hxy+by^2=0$ is coincident with one of the line represented by $a'x^2+2h'xy+b'y^2=0$, then

(a) $(ab'-a'b)^2=4(ah'-a'h)(hb'-h'b)$ (b) $(ab'+a'b)^2=4(ah'-a'h)(hb'-h'b)$

(c) $(ab'-a'b)^2=(ah'-a'h)(hb'-h'b)$ (d) None of these

8. The figure formed by the lines $x^2+4xy+y^2=0$ and $x-y=4$, is

(a) A right angled triangle (b) An isosceles triangle (c) An equilateral triangle (d) None of these

9. The equation of the pair of straight lines, each of which makes an angle α with the line $y=x$, is

(a) $x^2+2xy\sec 2\alpha+y^2=0$ (b) $x^2+2xy\operatorname{cosec} 2\alpha+y^2=0$

(c) $x^2-2xy\operatorname{cosec} 2\alpha+y^2=0$ (d) $x^2-2xy\sec 2\alpha+y^2=0$

10. The combined equation of the lines l_1, l_2 is $2x^2+6xy+y^2=0$ and that of the lines m_1, m_2 is $4x^2+18xy+y^2=0$. If the angle between l_1 and m_2 be α then the angle between l_2 and m_1 will be

(a) $\frac{\pi}{2}-\alpha$ (b) 2α (c) $\frac{\pi}{4}+\alpha$ (d) α

11. If θ_1 and θ_2 are the angles which the lines $x^2(\tan^2\theta+\cos^2\theta)-2xy\ \tan\theta+y^2\sin^2\theta=0$ make with the axis of *x*, then $\tan\theta_1-\tan\theta_2$ is equal to

(a) $\cos 2\theta$ (b) $2\cos\theta\sin\theta$ (c) 2 (d) 1

12. If the equation $ax^2+2hxy+by^2=0$ has the one line as the bisector of angle between the coordinate axes, then

(a) $(a-b)^2=h^2$ (b) $(a+b)^2=h^2$ (c) $(a-b)^2=4h^2$ (d) $(a+b)^2=4h^2$

13. If the bisectors of the angles between the pairs of lines given by the equation $ax^2+2hxy+by^2=0$ and $ax^2+2hxy+by^2+\lambda(x^2+y^2)=0$ be coincident, then $\lambda=$

(a) *a* (b) *b* (c) *h* (d) Any real number

14. If the bisectors of the angles of the lines represented by $3x^2-4xy+5y^2=0$ and $5x^2+4xy+3y^2=0$ are same, then the angle made by the lines represented by first with the second, is

(a) 30^o (b) 60^o (c) 45^o (d) 90^o

15. If pairs of straight lines $x^2-2mxy-y^2=0$ and $x^2-2nxy-y^2=0$ be such that each pair bisects the angle between the other pair, then $mn=$

(a) 1 (b) –1 (c) 0 (d) $-\frac{1}{2}$

16. If the lines represented by $x^2-2pxy-y^2=0$ are rotated about the origin through an angle θ, one in clockwise direction and other in anti –clockwise direction , then the equation of the bisectors of the angle between the lines in the new position is

(a) $px^2 + 2xy - py^2 = 0$ (b) $px^2 + 2xy + py^2 = 0$ (c) $x^2 - 2pxy + y^2 = 0$ (d) None of these

17. If $r(1-m^2) + m(p-q) = 0$, then a bisector of the angle between the lines represented by the equation $px^2 - 2rxy + qy^2 = 0$ is

(a) $y = x$ (b) $y = -x$ (c) $y = mx$ (d) $my = x$

18. The equations to a pair of opposite sides of a parallelogram are $x^2 - 5x + 6 = 0$ and $y^2 - 6y + 5 = 0$. The equations to its diagonals are

(a) $x + 4y = 13$ and $y = 4x - 7$ (b) $4x + y = 13$ and $4y = x - 7$

(c) $4x + y = 13$ and $y = 4x - 7$ (d) $y - 4x = 13$ and $y + 4x = 7$

19. The circumcentre of the triangle formed by the lines $xy + 2x + 2y + 4 = 0$ and $x + y + 2 = 0$ is

(a) $(0, 0)$ (b) $(-2, -2)$ (c) $(-1, -1)$ (d) $(-1, -2)$

20. If the equations of opposite sides of a parallelogram are $x^2 - 7x + 6 = 0$ and $y^2 - 14y + 40 = 0$, then the equation of its one diagonal is

(a) $6x + 5y + 14 = 0$ (b) $6x - 5y + 14 = 0$ (c) $5x + 6y + 14 = 0$ (d) $5x - 6y + 14 = 0$

21. The limiting position of the point of intersection of the straight lines $3x + 5y = 1$ and $(2+c)x + 5c^2y = 1$ as $c \to 1$ is

(a) $\left(\frac{2}{5}, \frac{-1}{25}\right)$ (b) $\left(\frac{1}{2}, -\frac{1}{10}\right)$ (c) $\left(\frac{3}{8}, \frac{-1}{40}\right)$ (d) None of these

22. If two sides of a triangle are represented by $x^2 - 7xy + 6y^2 = 0$ and the centroid is (1, 0), then the equation of third side is

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

23. If the lines $ax^2 + 2hxy + by^2 = 0$ represents the adjacent sides of a parallelogram, then the equation of second diagonal if one is $lx + my = 1$, will be

(a) $(am + hl)x = (bl + hm)y$ (b) $(am - hl)x = (bl - hm)y$ (c) $(am - hl)x = (bl + hm)y$ (d) None of these

24. The pair of lines joining the origin to the points of intersection of the curves $ax^2 + 2hxy + by^2 + 2gx = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x = 0$ will be at right angles to one another if

(a) $g(a'+b') = g'(a+b)$ (b) $g(a+b) = g'(a'+b')$ (c) $gg' = (a+b)(a'+b')$ (d) None of these

25. The square of distance between the point of intersection of the lines represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ and origin, is

(a) $\frac{c(a+b) - f^2 - g^2}{ab - h^2}$ (b) $\frac{c(a-b) + f^2 + g^2}{\sqrt{ab - h^2}}$ (c) $\frac{c(a+b) - f^2 - g^2}{ab + h^2}$ (d) None of these

26. If the portion of the line $lx + my = 1$ falling inside the circle $x^2 + y^2 = a^2$ subtends an angle of 45^o at the origin, then

(a) $4[a^2(l^2 + m^2) - 1] = a^2(l^2 + m^2)$ (b) $4[a^2(l^2 + m^2) - 1] = a^2(l^2 + m^2) - 2$

(c) $4[a^2(l^2 + m^2) - 1] = [a^2(l^2 + m^2) - 2]^2$ (d) None of these

27. Two of the lines represented by the equation $ay^4 + bxy^3 + cx^2y^2 + dx^3y + ex^4 = 0$ will be perpendicular, then

(a) $(b+d)(ad+be) + (e-a)^2(a+c+e) = 0$ (b) $(b+d)(ad+be) + (e+a)^2(a+c+e) = 0$

(c) $(b-d)(ad-be) + (e-a)^2(a+c+e) = 0$ (d) $(b-d)(ad-be) + (e+a)^2(a+c+e) = 0$

28. Let *PQR* be a right angled isosceles triangle, right angled at $P(2, 1)$. If the equation of the line *QR* is $2x + y = 3$, then the equation representing the pair of lines *PQ* and *PR* is

(a) $3x^2 - 3y^2 + 8xy + 20x + 10y + 25 = 0$ (b) $3x^2 - 3y^2 + 8xy - 20x - 10y + 25 = 0$

(c) $3x^2 - 3y^2 + 8xy + 10x + 15y + 20 = 0$ (d) $3x^2 - 3y^2 - 8xy - 10x - 15y - 20 = 0$

29. The area (in square units) of the quadrilateral formed by the two pairs of lines $l^2x^2 - m^2y^2 - n(lx + my) = 0$ and $l^2x^2 - m^2y^2 + n(lx - my) = 0$ is

(a) $\frac{n^2}{2|lm|}$ (b) $\frac{n^2}{|lm|}$ (c) $\frac{n}{2|lm|}$ (d) $\frac{n^2}{4|lm|}$

30. Two lines represented by the equation $x^2 - y^2 - 2x + 1 = 0$ are rotated about the point (1, 0), the line making the bigger angle with the positive direction of the *x*-axis being turned by 45^o in the clockwise sense and the other line being turned by 15^o in the anticlockwise sense. The combined equation of the pair of lines in their new positions is

(a) $\sqrt{3}x^2 - xy + 2\sqrt{3}x - y + \sqrt{3} = 0$ (b) $\sqrt{3}x^2 - xy - 2\sqrt{3}x + y + \sqrt{3} = 0$

(c) $\sqrt{3}x^2 - xy - 2\sqrt{3}x + \sqrt{3} = 0$ (d) None of these

31. The combined equation of three sides of a triangle is $(x^2 - y^2)(2x + 3y - 6) = 0$. If $(-2, a)$ is an interior point and (*b*, 1) is an exterior point of the triangle, then

(a) $2 < a < \frac{10}{3}$ (b) $-2 < a < \frac{10}{3}$ (c) $-1 < b < \frac{9}{2}$ (d) $-1 < b < 1$

32. The diagonals of a square are along the pair of lines whose equation is $2x^2 - 3xy - 2y^2 = 0$. If (2, 1) is a vertex of the square, then another vertex consecutive to it can be

(a) $(1, -2)$ (b) $(1, 4)$ (c) $(-1, 2)$ (d) $(-1, -4)$

33. The equation $x^3 - 6x^2y + 11xy^2 - 6y^3 = 0$ represent three straight lines passing through the origin, the slopes of which form an

(a) A.P. (b) G.P. (c) H.P. (d) None of these

34. If P_1, P_2 denote the length of the perpendiculars from the point $(2, 3)$ on the lines given by $15x^2 + 31xy + 14y^2 = 0$ then

(a) $P_1 + P_2 = \frac{31}{14}$ (b) $|P_1 - P_2| = \frac{31}{\sqrt{74}} - \frac{12}{\sqrt{13}}$ (c) $P_1 P_2 = \frac{372}{\sqrt{962}}$ (d) $P_1 P_2 = \frac{15}{14}$

35. The equation of the locus of feet of perpendicular drawn from the origin to the line passing through a fixed point (*a*, *b*) is

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

36. The product of perpendiculars drawn from the origin to the lines represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ will be

(a) $\frac{ab}{\sqrt{a^2 - b^2 + 4h^2}}$ (b) $\frac{bc}{\sqrt{a^2 - b^2 + 4h^2}}$ (c) $\frac{ca}{\sqrt{(a^2 + b^2) + 4h^2}}$ (d) $\frac{c}{\sqrt{(a-b)^2 + 4h^2}}$

37. A curve with equation of the form $y = ax^4 + bx^3 + cx + d$ has zero gradient at the point (0,1) and also touches the *x*-axis at the point (–1,0). Then the values of *x* for which the curve has negative gradients are

(a) $x > -1$ (b) $x < 1$ (c) $x < -1$ (d) $-1 \le x \le 1$

38. The distance between the parallel lines $9x^2 - 6xy + y^2 + 18x - 6y + 8 = 0$ is

(a) $\frac{1}{\sqrt{10}}$ (b) $\frac{2}{\sqrt{10}}$ (c) $\frac{4}{\sqrt{10}}$ (d) $\sqrt{10}$

39. The equation $8x^2 + 8xy + 2y^2 + 26x + 13y + 15 = 0$ represents a pair of straight lines. The distance between them is

(a) $\frac{7}{\sqrt{5}}$ (b) $\frac{7}{2\sqrt{5}}$ (c) $\frac{\sqrt{7}}{5}$ (d) None of these

40. The equation of second degree $x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0$ represents a pair of straight lines. The distance between them is

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

41. If the straight lines joining origin to the points of intersections of the line $x + y = 1$ with the curve $x^2 + y^2 + x - 2y - m = 0$ are perpendicular to each other, then the value of *m* should be

(a) 0 (b) 1/2 (c) 1 (d) – 1

42. The lines joining the points of intersection of the curve $(x-h)^2 + (y-k)^2 - c^2 = 0$ and the line $kx + hy = 2hk$ to the origin are perpendicular, then

(a) $c = h \pm k$ (b) $c^2 = h^2 + k^2$ (c) $c^2 = (h+k)^2$ (d) $4c^2 = h^2 + k^2$

43. The straight lines joining the origin to the points of intersection of the line $2x + y = 1$ and curve $3x^2 + 4xy - 4x + 1 = 0$ include an angle

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

44. If the acute angles between the pairs of lines $3x^2 - 7xy + 4y^2 = 0$ and $6x^2 - 5xy + y^2 = 0$ be θ_1 and θ_2 respectively, then

(a) $\theta_1 = \theta_2$ (b) $\theta_1 = 2\theta_2$ (c) $2\theta_1 = \theta_2$ (d) None of these

45. If the lines represented by the equation $2x^2 - 3xy + y^2 = 0$ make angles α and β with *x*-axis, then $\cot^2\alpha + \cot^2\beta =$

(a) 0 (b) $\frac{3}{2}$ (c) $\frac{7}{4}$ (d) $\frac{5}{4}$

46. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then *c* equals

(a) –3 (b) –1 (c) 3 (d) 1

47. If $ax^2 - y^2 + 4x - y = 0$ represents a pair of lines, then *a* =

(a) –16 (b) 16 (c) 4 (d) – 4

48. The value of λ, for which the equation $x^2 - y^2 - x + \lambda y - 2 = 0$ represent a pair of straight lines, are

(a) 3, –3 (b) –3, 1 (c) 3, 1 (d) –1, 1

49. The gradient of one of the lines of $ax^2 + 2hxy + by^2 = 0$ is twice that of the other, then

(a) $h^2 = ab$ (b) $h = a + b$ (c) $8h^2 = 9ab$ (d) $9h^2 = 8ab$

50. If the slope of one line of the pair of lines represented by $ax^2 + 4xy + y^2 = 0$ is 3 times the slope of the other line, then *a* is

(a) 1 (b) 2 (c) 3 (d) 4