1. Slope of a line which cuts intercepts of equal lengths on the axes is

(a) - 1 (b) 0 (c) 2 (d) $\sqrt{3}$

2. The equation of a straight line passing through (- 3, 2) and cutting an intercept equal in magnitude but opposite in sign from the axes is given by

(a) $x-y+5=0$ (b) $x+y-5=0$

(c) $x-y-5=0$ (d) $x+y+5=0$

3. The equation of the straight line passing through the point (4, 3) and making intercept on the co-ordinates axes whose sum is - 1, is

(a) $\frac{x}{2}-\frac{y}{3}=-1$ and $\frac{x}{2}+\frac{y}{1}=1$

(b) $\frac{x}{2}-\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

(c) $\frac{x}{2}-\frac{y}{3}=1$ and $\frac{x}{2}+\frac{y}{1}=1$

(d) $\frac{x}{2}+\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

4. A line passes through (2, 2) and is perpendicular to the line $3x+y=3$. Its *y*-intercept is

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) 1 (d) $\frac{4}{3}$

5. The distance of the point (-2, 3) from the line $x-y=5$ is

(a) $5\sqrt{2}$ (b) $2\sqrt{5}$

(c) $3\sqrt{5}$ (d) $5\sqrt{3}$

6. The distance between the lines $4x+3y=11$ and $8x+6y=15$ is

(a) $\frac{7}{2}$ (b) 4 (c) $\frac{7}{10}$ (d) None of these

7. If the length of the perpendicular drawn from origin to the line whose intercepts on the axes are *a* and *b* be *p*, then

(a) $a^2+b^2=p^2$ (b) $a^2+b^2=\frac{1}{p^2}$

(c) $\frac{1}{a^2}+\frac{1}{b^2}=\frac{2}{p^2}$ (d) $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{p^2}$

8. The point on the *x*-axis whose perpendicular distance from the line $\frac{x}{a}+\frac{y}{b}=1$ is *a*, is

(a) $\left[\frac{a}{b}(b\pm\sqrt{a^2+b^2}),0\right]$ (b) $\left[\frac{b}{a}(b\pm\sqrt{a^2+b^2}),0\right]$

(c) $\left[\frac{a}{b}(a\pm\sqrt{a^2+b^2}),0\right]$ (d) None of these

9. The straight lines $4ax+3by+c=0$ where $a+b+c=0$, will be concurrent, if point is

(a) (4, 3) (b) $\left(\frac{1}{4},\frac{1}{3}\right)$

(c) $\left(\frac{1}{2},\frac{1}{3}\right)$ (d) None of these

10. The straight lines of the family x(a + b) + y (a - b) = 2a (a and b being parameters) are

(a) Not concurrent (b) Concurrent at (1, -1)

(c) Concurrent at (1, 1) (d) None of these

11. The straight line y = x-2 rotates about a point where it cuts the x-axis and becomes perpendicular to the straight line ax + by + c = 0. Then its equation is

(a) ax + by + 2a = 0 (b) ax - by - 2a = 0

(c) bx + ay - 2b = 0 (d) ay - bx + 2b = 0

12. The area of the rhombus enclosed by the lines ax ± by ± c = 0 is

(a) $2c^2/ab$ (b) $2ab/c^2$

(c) 2c/ab (d) None of these

13. The equation of line through (1, 2) and parallel to 3x - y - 4 = 0 is-

(a) 3x - y + 1 = 0 (b) x + 3y - 1 = 0

(c) x - 3y + 1 = 0 (d) 3x - y -1 = 0

14. Equation of a straight line on which length of perpendicular from the origin is four units and the line makes an angle of 120° with the x-axis, is-

(a) $x\sqrt{3}+y+8=0$ (b) $x\sqrt{3}-y=8$

(c) $x\sqrt{3}+y=8$ (d) $x-\sqrt{3}y+8=0$

15. The equation of straight line passing through point of intersection of the straight lines $3x-y+2=0$ and $5x-2y+7=0$ and having infinite slope is

(a) $x=2$ (b) $x+y=3$

(c) $x=3$ (d) $x=4$

16. To which of the following types the straight lines represented by $2x+3y-7=0$ and $2x+3y-5=0$ belongs

(a) Parallel to each other

(b) Perpendicular to each other

(c) Inclined at 45^0 to each other

(d) Coincident pair of straight lines

17. In an isosceles triangle *ABC*, the coordinates of the point *B* and *C* on the base *BC* are respectively (1, 2) and (2, 1). If the equation of the line *AB* is $y=2x$, then the equation of the line *AC* is

(a) $y=\frac{1}{2}(x-1)$ (b) $y=\frac{x}{2}$

(c) $y=x-1$ (d) $2y=x+3$

18. The algebraic sum of the perpendicular distances from the points (2,0), (0, 2) and (1, 1) to a variable straight line is zero. The line passes through a fixed point whose co-ordinates are

(a) (1, 2) (b) (2, 1)

(c) (1, 1) (d) (2, 2)

19. Let 2x-3y =0 be a given line and P (sinθ, 0) and Q (0, cosθ) be the two points. Then P and Q lie on the same side of the given line, if θ lies in the

(a) 1st quadrant (b) 2nd quadrant

(c) 3rd quadrant (d) None of these

20. Two particles start from the point (2, -1), one moving 2 units along the line x + y = 1 and the other 5 units along the line x - 2y = 4. If the particles move towards increasing y, then their new positions are
(a) $(2-\sqrt{2}, \sqrt{2}-1), (2\sqrt{5}+2, \sqrt{5}-1)$
(b) $(2\sqrt{5}+2, \sqrt{5}-1), (2+\sqrt{2}, \sqrt{2}+1)$
(c) $(2+\sqrt{2}, \sqrt{2}+1), (2\sqrt{5}+2, \sqrt{5}+1)$
(d) None of these

21. The equation of the line whose slope is 3 and which cuts off an intercept 3 from the positive x-axis, is-
(a) y = 3x -9 (b) y = 3x + 3
(c) y = 3x + 9 (d) None of these

22. The distance between the lines 3x + 4y = 9 and 6x + 8y = 15 is-
(a) 3/2 (b) 3/10 (c) 6 (d) None

23. Three lines 3x - y = 2, 5x + ay = 3 and 2x + y = 3 are concurrent, then a =
(a) 2 (b) 3 (c) -1 (d) -2

24. Let P(-1, 0), Q(0, 0) and R $(3, 3\sqrt{3})$ be three points. Then the equation of the bisector of the angle PQR is-
(a) $\frac{\sqrt{3}}{2}x + y = 0$ (b) $x + \sqrt{3}y = 0$
(c) $\sqrt{3}x + y = 0$ (d) $x + \frac{\sqrt{3}}{2}y = 0$

25. The equation of straight line equally inclined to the axes and equidistant from the point (1, -2) and (3, 4) is-
(a) x + y = 1 (b) y - x - 1 = 0
(c) y - x = 2 (d) y - x + 1 = 0

26. The number of points on the line 3x + 4y = 5, which are at a distance of $\sec^2\theta + 2\operatorname{cosec}^2\theta$, $\theta \in R$, from the point (1, 3), is-
(a) 1 (b) 2 (c) 3 (d) Infinite

27. The number of integral points (x, y) (that is x and y both are integers) which lie in the first quadrant but not on the coordinate axes and also on the straight line 3x + 5y = 2007 is equal to
(a) 133 (b) 135 (c) 138 (d) 140

28. If $a^2 + b^2 - c^2 - 2ab = 0$, then the family of straight lines ax + by + c = 0 is concurrent at the points-
(a) (-1, 1), (1, - 1) (b) (1, 1), (1, - 1)
(c) (-1, -1), (1, 1) (d) (-1, -1)

29. Point of intersection of straight lines represented by $6x^2 + xy - 40y^2 - 35x - 83y + 11 = 0$ is-
(a) (3, 1) (b) (3, -1)
(c) (-3, 1) (d) (-3, -1)

30. M is the middle-point of the line joining $(ma, -\ell b), (mb, -\ell a)$. P is a variable point on the line $\ell x + my = n$. The loci of the points of trisection of PM are-
(a) Independent of a and b
(b) Independent of ℓ and m
(c) Straight lines which intersect the locus of P at a finite point
(d) None of these

31. The vertices of a triangle are A(-1, -7), B(5, 1) and C(1, 4). The equation of the bisector of the angle $\angle ABC$ is-
(a) x + 7y + 2 = 0 (b) x - 7y + 2 = 0
(c) x - 7y - 2 = 0 (d) x + 7y - 2 = 0

32. Consider the family of lines $(x + y - 1) + \lambda(2x + 3y - 5) = 0$ & $(3x + 2y - 4) + \mu(x + 2y - 6) = 0$, then the equation of a straight line that belongs to both the families is:
(a) x - 2y - 8 = 0 (b) x - 2y + 8 = 0
(c) 2x + y - 8 = 0 (d) 2x - y - 8 = 0

33. The equation of a line through the point (1, 2) whose distance from the point (3, 1) has the greatest possible value is-
(a) x + 2y = 3 (b) y = 2x
(c) y = x + 1 (d) x + 2y = 5

34. A straight line L with negative slope passes through the points (8, 2) and cuts the positive coordinate axes at points P and Q. As L varies the absolute minimum value of OP + OQ is (O is origin)-
(a) 28 (b) 15 (c) 18 (d) 10

35. The point $(a^2, a + 1)$ lies in the angle between the line 3x - y + 1= 0 and x + 2y - 5 = 0 containing the origin if -
(a) $a \in (-3, 0) \cap \left(\frac{1}{3}, 1\right)$ (b) $a \in (-\infty, -3) \cup \left(\frac{1}{3}, 1\right)$
(c) $a \in \left(-3, \frac{1}{3}\right)$ (d) $a \in \left(\frac{1}{3}, \infty\right)$

36. The reflection of the curve xy = 1 in the line y = 2x is the curve $12x^2 + rxy + sy^2 + t = 0$, then the value of r is-
(a) -7 (b) 25
(c) -175 (d) None of these

37. The equation to the line which passes through the point of intersection of the two lines 2x + 3y - 1 = 0 and 3x +2y+1= 0, and is normal to the line joining (2, 4), (4, 7) is-
(a) 2y - x - 7 = 0 (b) y - 2x - 6 = 0
(c) 4x + 6y - 1 = 0 (d) None of these

38. Pair of lines through (1, 1) and making equal angle with 3x - 4y = 1 and 11x + 4y = 1 intersect x-axis at P1 and P2, then P1, P2 may be-
(a) $\left(\frac{8}{7}, 0\right)$ and $\left(\frac{9}{7}, 0\right)$
(b) $\left(\frac{7}{8}, 0\right)$ and (9, 0)
(c) $\left(\frac{8}{7}, 0\right)$ and $\left(\frac{1}{8}, 0\right)$
(d) (8, 0) and $\left(\frac{1}{8}, 0\right)$

39. Family of lines $\lambda x + 3y - 6 = 0$ (λ is a real parameter) intersect the lines x - 2y + 3 = 0 and x - y + 1 = 0 in P and Q, then locus of the middle point of PQ is-
(a) 4x + 2y = 1 (b) x + y = 2
(c) 2x - 2y + 4 = 0 (d) 4x + 3y = 4

40. A system of lines is given as $y = m_ix + c_i$, where m_i can take any value out of 0, 1, -1 and when m_i is positive then c_i can be 1 or -1 when m_i equal 0, c_i can be 0 or 1 and when m_i equal -1, c_i can take 0 or 2. Then the area enclosed by all these straight lines is

(a) $\frac{3}{\sqrt{2}}(\sqrt{2}-1)$ (b) $\frac{3}{\sqrt{2}}$

(c) $\frac{3}{2}$ (d) None of these

41. The intercepts on the straight line y = mx by the lines y = 2 and y = 6 is less than 5 then m belongs to

(a) $\left(-\frac{4}{3}, \frac{4}{3}\right)$ (b) $\left(\frac{4}{3}, \frac{3}{8}\right)$

(c) $\left(-\infty, -\frac{4}{3}\right) \cup \left(\frac{4}{3}, \infty\right)$ (d) $\left(\frac{4}{3}, \infty\right)$

42. The number of positive integral values of a such that the lines x - 4y = 1 and ax + 3y = 1 intersect at an integral point, (integral point is a point both of whose coordinates are integers), is

(a) 0 (b) 1 (c) 2 (d) 3

43. In a triangle ABC, if A(2, -1) and 7x - 10y + 1 = 0 and 3x - 2y + 5 = 0 are equations of an altitude and an angle bisector respectively drawn from B, then equation of BC is-

(a) x + y + 1 = 0 (b) 4x + 9y + 30 = 0

(c) 5x + y + 17 = 0 (d) x - 5y - 7 = 0

44. ABC is a variable triangle such that A is (1, 2), B & C lie on the line $y = x + \lambda$ (λ is variable) then locus of ortho centre of ΔABC is-

(a) x + y = 0 (b) x - y = 0

(c) $x^2 + y^2 = 4$ (d) x + y = 3

45. Two of straight lines given by $3x^3 + Py^3 + 3x^2y - 3xy^2 = 0$ are at 90^0, if

(a) $P = -\frac{1}{3}$ (b) $P = \frac{1}{3}$ (c) P = -3 (d) P = 3

46. $(3x + 4y + 1)^2 + (x + y + 3)^2 = 0$ represents-

(a) A point (b) A hyperbola

(c) A pair of straight lines (d) An ellipse

47. Triangle formed by the lines x + y = 0, x - y = 0 and $\ell x + my = 1$. If ℓ and m vary subject to the condition $\ell^2 + m^2 = 1$, then the locus of its circumcentre is-

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

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

48. The number of possible straight lines, passing through (2, 3) and forming a triangle with co-ordinate axes, whose area is 12 sq. units is

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

49. The circum-center of the triangle formed by the lines xy + 2x + 2y + 4 = 0 and x + y + 2 = 0 is -

(a) (-2, -2) (b) (0, 0)

(c) (-1, -2) (d) (-1, -1)

50. Through the point $P(\alpha, \beta)$ where $\alpha\beta > 0$, the straight line $\frac{x}{a} + \frac{y}{b} = 1$ is drawn so as to form with axes a triangle of area S. If ab> 0 then least value of S is

(a) $\alpha\beta$ (b) $2\alpha\beta$

(c) $3\alpha\beta$ (d) None

51. A ray of light passing through the point A(1, 2) is reflected at a point B on the x-axis and then passes through (5, 3). Then the equation of AB is

(a) 5x + 4y = 13 (b) 5x - 4y = -3

(c) 4x + 5y = 14 (d) 4x - 5y = - 6

52. If $\alpha\beta > 0$, ab> 0 and the variable line $\frac{x}{a} + \frac{y}{b} = 1$ is drawn through the given point $P(\alpha, \beta)$, then the least area of the triangle formed by this line and the co-ordinate axes is -

(a) $\alpha\beta$ (b) $2\alpha\beta$

(c) $3\alpha\beta$ (d) None of these

53. If equation $4x^2 + 2pxy + 25y^2 + 2x + 5y - 1 = 0$ represents parallel lines then p is equal to:

(a) -10 (b) 10 (c) 5 (d) -2

54. P(3, 1), Q(6, 5) and R(x, y) are three points such that the angle PRQ is a right angle and the area of ΔRQP = 7, then the number of such points R is-

(a) 0 (b) 1 (c) 2 (d) 4

55. If a, b, c are in A.P., then the straight line ax + by + c = 0 always passes through the fixed point-

(a) (2, -1) (b) (1, 1)

(c) (1, -2) (d) $\left(\frac{-1}{3}, \frac{2}{3}\right)$

56. Area of a square inscribed in the incircle of an equilateral triangle of side a is-

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

57. If the point $\left(\frac{a^3}{a-1}, \frac{a^2-3}{a-1}\right)$, $\left(\frac{b^3}{b-1}, \frac{b^2-3}{b-1}\right)$ and $\left(\frac{c^3}{c-1}, \frac{c^2-3}{c-1}\right)$ are collinear for distinct a, b, c and $\alpha abc + \beta(a + b + c) + \gamma(ab + bc + ca) = 0$ then value of $\alpha^2 + \beta^2 + \gamma^2$ is-

(a) 10 (b) 9

(c) 4 (d) None of these

58. The point $(a^2, a + 1)$ lies in the angle between the lines 3x - y + 1 = 0 and x + 2y - 5 = 0 containing the origin, if-

(a) $a \in (-3, 0) \cup \left(\frac{1}{3}, 1\right)$

(b) $a \in (-\infty, 3) \cup \left(\frac{1}{3}, 1\right)$

(c) $a \in \left(-3, \frac{1}{3}\right)$ (d) $a \in \left(\frac{1}{3}, \infty\right)$

59. The point A(2, 1) is translated parallel to the line x - y = 3 by 4 units. If the new point lies in the third quadrant, then the coordinates of the new point are-

(a) $\left(\frac{2}{3}, \frac{-1}{3}\right)$ (b) $\left(\frac{1}{2}, \frac{-1}{2}\right)$

(c) $\left(-\sqrt{2}+1, -\sqrt{2}\right)$ (d) $\left(2-2\sqrt{2}, 1-2\sqrt{2}\right)$

60. For how many integral values of m do the lines y + mx - 1 = 0 and 3x + 4y = 9 intersect in points having integral coordinates -

(a) 0 (b) 1 (c) 2 (d) Infinite

61. If one diagonal of a square is along the line x = 2y and one of its vertex is (3, 0), then its sides through this vertex are given by the equations-

(a) y - 3x + 9 = 0, x - 3y - 3 = 0

(b) y - 3x + 9 = 0, x - 3y - 3 = 0

(c) y + 3x - 9 = 0, x + 3y - 3 = 0

(d) y - 3x + 9 = 0, x + 3y - 3 = 0

62. A (a, 0), B (b, 0), C (c, 0) and D(d, 0) are four given points. If $\frac{CA}{CB} + \frac{DA}{DB} = 0$, then-

(a) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c} + \frac{1}{d}$ (b) (a + b) (c + d) = 2 (ab + cd)

(c) (a + b) ab = (c + d) cd (d) None of these

63. ABC is an equilateral triangle of side 'a'. L, M and N are foot of the perpendiculars drawn from a point P to the sides AB, BC and CA respectively. If P lies inside the triangle and satisfies the condition $PL^2 = PM \cdot PN$, then locus of P is-

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

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

(c) $x^2 + y^2 - ax + \frac{a}{\sqrt{3}} y = 0$

(d) None of these

64. Number of lines drawn from the point (4, -5) so that its distance from (-2, 3) will be equal to 12 are-

(a) 2 (b) 1

(c) 4 (d) None of these

65. A line of fixed lingth2 units moves so that its ends are on the positive x-axis and that part of the line x + y = 0 which lies in the second quadrant. Then the locus of the mid-point of the line has the equation-

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

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

66. The liens y = mx bisects the angle between the lines $ax^2 + 2hxy + by^2 = 0$ if -

(a) $h(1 + m^2) = m(a + b)$ (b) $h(1 - m^2) = m(a - b)$

(c) $h(1 + m^2) = m(a - b)$ (d) None of these

67. The line $\frac{x}{3} + \frac{y}{4} = 1$ meets the axis of y and axis of x at A and B respectively. A square ABCD is constructed on the line segment AB away from the origin, the coordinates of the vertex of the square farthest from the origin are -

(a) (7, 3) (b) (4, 7)

(c) (6, 4) (d) (3, 8)

68. The equation of the straight line which passes through the point (1, - 2) and cuts off equal intercepts from axes, is

(a) x + y = 1 (b) x - y = 1

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

69. If a and b are two arbitrary constants, then the straight line (a - 2b) x + (a + 3b) y + 3a+ 4b = 0 will pass through

(a) (- 1, - 2) (b) (1, 2)

(c) (- 2 , - 3) (d) (2, 3)

70. The point on the line x + y = 4 which lie at a unit distance from the line 4x + 3y = 10, are

(a) (3, 1), (- 7, 11) (b) (3, 1), (7, 11)

(c) (- 3, 1), (- 7, 11) (d) (1, 3),(- 7, 11)

71. If the lines $y = (2 + \sqrt{3})x + 4$ and y = kx + 6 are inclined at an angle 60^0 to each other, then the value of k will be

(a) 1 (b) 2 (c) - 1 (d) - 2

72. If the line $\frac{x}{a} + \frac{y}{b} = 1$ passes through the points (2, - 3) and (4, - 5) then (a, b) =

(a) (1, 1) (b) (- 1, 1)

(c) (1, - 1) (d) (-1, -1)

73. The equation of the line which makes right angled triangle with axes whose area is 6 sq. units and whose hypotenuse is of 5 units is -

(a) $\frac{x}{4} + \frac{y}{3} = \pm 1$ (b) $\frac{x}{4} - \frac{y}{3} = \pm 3$

(c) $\frac{x}{6} + \frac{y}{1} = \pm 1$ (d) $\frac{x}{1} - \frac{y}{6} = \pm 1$

74. Equation of the line passing through (-1, 1) and perpendicular to the line 2x + 3y + 4 = 0, is

(a) 2(y - 1) = 3(x + 1) (b) 3(y - 1) = -2(x + 1)

(c) y - 1 = 2(x + 1) (d) 3(y - 1) = x + 1

75. Equation to the straight line cutting off and intercept 2 from the negative direction of the axis of y and inclined at 30^0 to the positive direction of axis of x, is

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

(c) $y - \sqrt{3}x - 2 = 0$ (d) $\sqrt{3}y - x + 2\sqrt{3} = 0$

76. The bisectors BD and CF of a triangle ABC have equations y = x and x = 10. If A is (3, 5) then equation of BC is-

(a) 5y -2x = 11 (b) 6y -5x = 17

(c) 6y -x = 13 (d) None of these

77. A straight line passes through the point A (3, 4). Its intercept between the axes is bisected at A. its equation is -

(a) 3x - 4y = 7 (b) 3x + 4y = 5

(c) $4x + 3y = 24$ (d) None of these

78. A straight line L is perpendicular to the line $5x - y = 1$. If the area of the triangle formed by the line L and the co-ordinate axis is 5 then the equation of line L is -

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

(c) $x + 5y \pm 5\sqrt{2} = 0$ (d) None of these

79. The value of k such that the lines $2x - 3y + k = 0$, $3x - 4y - 13 = 0$ and $8x - 11y - 33 = 0$ are concurrent, is -

(a) 20 (b) - 7 (c) 7 (d) - 20

80. The line $\frac{x}{a} + \frac{y}{b} = 1$ meets the x-axis at A and y-axis at B and the line $y = x$ at C such that the area of the ΔAOC is twice the area of ΔBOC. Then the coordinates of C are

(a) $\left(\frac{b}{3}, \frac{b}{3}\right)$ (b) $\left(\frac{2a}{3}, \frac{2a}{3}\right)$

(c) $\left(\frac{2b}{3}, \frac{2b}{3}\right)$ (d) None

81. The equations of sides of a triangle ABC are AB : $x + y = 1$, BC : $7x - y = 15$, AC : $3x - y = 7$ the equation of angular bisector containing origin of angle B is

(a) $2x + y = 3$ (b) $3x + y = 5$

(c) $x + 3y = 7$ (d) $3y - x = -5$

82. A and B are the points (2, 0) and (0, 2) respectively. The coordinates of the point P on the line $2x + 3y + 1 = 0$ such that $|PA - PB|$ is minimum, will be :

(a) (7, - 5) (b) $\left(-\frac{1}{5}, -\frac{1}{5}\right)$

(c) (-7, 5) (d) $\left(-\frac{1}{5}, \frac{1}{5}\right)$

83. If (a, a^2) falls inside the angle made by the lines $y = x/2$, $x > 0$ and $y = 3x$, $x > 0$, then 'a' belongs to :

(a) $(3, \infty)$ (b) $\left(\frac{1}{2}, 3\right)$

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

84. The vertex of an equilateral triangle is (2, -1) and the equation of its base is $x + 2y = 1$. The length of its sides is :

(a) $\frac{4}{\sqrt{15}}$ (b) $\frac{2}{\sqrt{15}}$

(c) $\frac{4}{3\sqrt{3}}$ (d) $\frac{1}{\sqrt{5}}$

85. If P is a point (x, y) on the line $y = -3x$ such that P & the point (3, 4) are on the opposite sides of the line $3x - 4y = 8$; then :

(a) $x > 8/15$, $y < -8/5$ (b) $x > 8/5$, $y < -8/15$

(c) $x = 8/15$, $y = -8/5$ (d) None of these

86. Slope of line whose parametric equation is given by $x = -2 + \frac{r}{\sqrt{10}}$, $y = 1 + \frac{3r}{\sqrt{10}}$ is :

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

87. Nearest point on line $x - 3y = 5$ from point (1, 2) is :

(a) (2, -1) (b) $\left(3, -\frac{2}{3}\right)$

(c) (0, 0) (d) (5, 0)

88. A ray of light is sent along the line which passes through point (2, 3). The ray is reflected from point P on x-axis. If reflected ray passes through the point (6, 5) then coordinates of P are -

(a) $\left(-\frac{7}{2}, 0\right)$ (b) $\left(\frac{7}{2}, 0\right)$

(c) $\left(0, \frac{7}{2}\right)$ (d) None of these

89. The angle between the line joining the points (1, -2), (3, 2) and the line $x + 2y - 7 = 0$, is

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

90. A line meets the coordinate axes at A and B such that the centroid of the ΔOAB is (1, 2) the equation of the line AB is

(a) $x + y = 6$ (b) $2x + y = 6$

(c) $x + 2y = 6$ (d) None

91. A triangle is formed by the lines whose combined equation is given by $(x + y - 4)(xy - 2x - y + 2) = 0$. The equation of its circumcircle is-

(a) $x^2 + y^2 - 5x - 3y + 8 = 0$ (b) $x^2 + y^2 - 3x - 5y + 8 = 0$

(c) $x^2 + y^2 - 3x - 5y - 8 = 0$ (d) None of these

92. If pair of straight lines $ax^2 + 2hxy + by^2 = 0$ is rotated by an angle of 90° about origin then their equation in new position are given by -

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

(c) $bx^2 + 2hxy + ay^2 = 0$ (d) $bx^2 - 2hxy + ay^2 = 0$

93. If lines $x + 2y - 1 = 0$, $ax + y + 3 = 0$ and $bx - y + 2 = 0$ are concurrent and let S be the curve denoting locus of (a, b). Then the least distance of S from the origin is.

(a) $\frac{5}{\sqrt{57}}$ (b) $\frac{5}{\sqrt{51}}$ (c) $\frac{5}{\sqrt{58}}$ (d) $\frac{5}{\sqrt{59}}$

94. P (m,n) (where m, n are natural number) is any point in the interior of the quadrilateral formed by the pair of lines $xy = 0$ and the two lines $2x + y - 2 = 0$ and $4x + 5y = 20$. The possible number of positions of the point P is -

(a) Six (b) Five

(c) Four (d) Eleven

95. The straight lines joining the origin to the intersection points of the curves whose equations are $ax^2 + 2hxy + by^2 + 2gx = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x = 0$ are at right angles if-

(a) $(a + b)g' = (a' + b')g$

(b) $\left(\frac{1}{a}+\frac{1}{b}\right)g' = \left(\frac{1}{a'}+\frac{1}{b'}\right)g$

(c) $(g' + h')(a' + b') = (g + h)(a' + b')$

(d) $\frac{1}{g'}+\frac{1}{h'}=\frac{1}{g}+\frac{1}{h}$

96. If area of the triangle having vertices (a, b), (b, c) and (c, a) is Δ, then area of the triangle having vertices $(ac - b^2, ab - c^2)$, $(ba - c^2, bc - a^2)$ and $(cb - a^2, ca - b^2)$ is-

(a) $2\,abc\Delta$ (b) Δ

(c) $\frac{\Delta}{a+b+c}$ (d) $(a + b + c)^2\Delta$

97. The equation of a straight line passing through (-3, 2) and cutting an intercept equal in magnitude but opposite in sign from the axes is given by

(a) $x - y + 5 = 0$ (b) $x + y - 5 = 0$

(c) $x - y - 5 = 0$ (d) $x + y + 5 = 0$

98. If A (2, - 1) and B(6, 5) are two points the ratio in which the foot of the perpendicular from (4, 1) to AB divides it, is-

(a) 8 :15 (b) 5 : 8

(c) - 5 : 8 (d) - 8 : 5

99. If the points (1, 2) & (3, 4) are to be on the same side of the line $3x - 5y + a = 0$ then

(a) $1 < a < 6$ (b) $7 < a < 11$

(c) $a > 11$ (d) $a < 7$ or $a > 11$

100. The straight line $ax + by + c = 0$ where $abc \neq 0$ will pass through the first quadrant if-

(a) $ac < 0$, $bc > 0$ (b) $ac > 0$ and $bc < 0$

(c) $bc > 0$ and/or $ac > 0$ (d) $ac < 0$ and/or $bc < 0$