kd education academy (9582701166)

Time : 6 Hour | **STD 11 Science Maths** | **Total Marks : 354**

kd 90+ ch-9 straight line basic to jee

*** Match the following.** **[10]**

1.

Part (A)	Part (B)
1. The angle between the lines$2x-y+3=0$ and $x+2y+3=0$	(a) $-\frac{7}{2}$
2. The image of point $(4,-13)$ in line $5x+y+6=0$	(b) $(-1,-14)$
3. Point at equal distance from lines $4x+3y-10-0$, $5x-12y+26=0$ and $7x+24y-50=0$	(c) 90°
4. If slope of line passing through points $(2,5)$ and $(x,3)$ is 2 , then the value of x is	(d) $(0,0)$
5. The slope of line passing through points $(3,-5)$ and $(1,2)$	(e) 1

2.

Part (A)	Part (B)
1. The slope of line passing through points $(3,-5)$ and $(1,2)$	(a) $x=2$
2. Equation of line parallel to x-axis and passing through point $(3,-5)$	(b) $-\frac{7}{2}$
3. Equation of line parallel to x-axis and is at equal distance from lines $x=-2$ and $x=6$	(c) $y=2x+3$
4. Equation of line having slope 2 and which cuts y-intercept as 3 .	(d) $y=-5$
5. Equation of line passing through point $(6,2)$ having slope -3	(e) $3x+y-20=0$

*** Choose the right answer from the given options. [1 Marks Each]** **[78]**

3. The distance between the orthocentre and circumcentre of the triangle with vertices (1, 2), (2, 1) and $\left(\frac{3+\sqrt{3}}{2},\frac{3+\sqrt{3}}{2}\right)$ is:

   (A) 0 (B) $\sqrt{2}$ (C) $3+\sqrt{3}$ (D) none of these.

4. Find slope of line joining (1, 2) and (4, 11):

   (A) $\frac{1}{3}$ (B) 3 (C) 9 (D) $\frac{1}{9}$

5. The reflection of the point (4, -13) about the line 5x + y + 6 = 0 is:

   (A) (-1, -14) (B) (3, 4) (C) (0, 0) (D) (1, 2)

6. The equation of the line passing through (1, 5) and perpendicular to the line 3x - 5y + 7 = 0 is:

   (A) 5x + 3y - 20 = 0 (B) 3x - 5y + 7 = 0 (C) 3x - 5y + 6 = 0 (D) 5x + 3y + 7 = 0

7. The line segment joining the points (1, 2) and (-2, 1) is divided by the line 3x + 4y = 7 in the ratio:

   (A) 3 : 4 (B) 4 : 3 (C) 9 : 4 (D) 4 : 9

8. If p_1 and p_2 are the lengths of the perpendiculars from the origin upon the lines $x\sec\theta + y\operatorname{cosec}\theta = a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta$ respectively, then:

   (A) $4p_1^2 + p_2^2 = a^2$ (B) $p_1^2 + 4p_2^2 = a^2$ (C) $p_1^2 + 4p_2^2 = a^2$ (D) None of these.

9. Choose the correct answer.
   The coordinates of the foot of perpendiculars from the point (2, 3) on the line y = 3x + 4 is given by

   (A) $\frac{37}{10}, \frac{-1}{10}$ (B) $\frac{-1}{10}, \frac{37}{10}$ (C) $\frac{10}{37}, -10$ (D) $\frac{2}{3}, -\frac{1}{3}$

10. Area of the triangle formed by the points ((a + 3)(a + 4), a + 3), ((a + 2)(a + 3), (a + 2)) and ((a + 1)(a + 2), (a + 1)) is:

    (A) $25a^2$ (B) $5a^2$ (C) $24a^2$ (D) None of these.

11. The centroid of the triangle with vertices (2, 6), (-5, 6) and (9,3) is:

    (A) (2, -3) (B) (2, 5) (C) (-2, 3) (D) (-2, -3)

12. A(6, 3), B(-3, 5), C(4, -2) and D(x, 3x) are four points. If $\triangle DBC : \triangle ABC = 1 : 2$, then x is equal to:

    (A) $\frac{11}{8}$ (B) $\frac{8}{11}$ (C) 3 (D) None of these

13. The ratio in which the line 3x + 4y + 2 = 0 divides the distance between the line 3x + 4y + 5 = 0 and 3x + 4y - 5 = 0 is:

    (A) 1 : 2 (B) 3 : 7 (C) 2 : 3 (D) 2 : 5

14. Slope of a line is given by if inclination of line is α:

    (A) $\sin\alpha$ (B) $\cos\alpha$ (C) $\tan\alpha$ (D) $\cot\alpha$

15. If equation of line is y = 5x + 10 then find the value of x-intercept made by the line:

    (A) 2 (B) $\frac{1}{2}$ (C) $\frac{-1}{2}$ (D) -2

16. If p be the length of the perpendicular from the origin on the line $\frac{x}{a} + \frac{y}{b} = 1$, then:

    (A) $p^2 = a^2 + b^2$ (B) $p^2 = \frac{1}{a^2} + \frac{1}{b^2}$ (C) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$ (D) None of these.

17. Angle made by line with measured anticlockwise is called inclination of the line:

    (A) Positive x-axis (B) Negative x-axis (C) Positive y-axis (D) Negative y-axis

18. The equation of the straight line which passes through the point (-4, 3) such that the portion of the line between the axes is divided internally by the point in the ratio 5 : 3 is:

    (A) 9x - 20y + 96 = 0 (B) 9x + 20y = 24 (C) 20x + 9y + 53 = 0 (D) none of these.

19. If -40°F is equal to -40°C and 0°C is equal to 32°F then find the value of 40°C:

    (A) 104°F (B) 112°F (C) 86°F (D) 92°F

20. Find slope of line if inclination made by the line is 60°.

(A) $\frac{1}{2}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\sqrt{3}$ (D) 1

21. Find the equation of line parallel to 4x + y = 2 and pass through (2, 5):
(A) 4x + y - 13 = 0 (B) 4x + y + 13 = 0 (C) 4x - y - 13 = 0 (D) 4x - y + 13 = 0

22. The locus of a point, whose abscissa and ordinate are always equal is:
(A) x - y = 0 (B) x + y = 1 (C) x + y + 1 = 0 (D) None of the above

23. The equation of a line that passes through the points (1, 5) and (2, 3) is:
(A) 2x + y - 7 = 0 (B) 2x - y - 7 = 0 (C) x + 2y - 7 = 0 (D) 2x + y + 7 = 0

24. If a line with slope m makes x-intercept d. Then equation of the line is:
(A) y = m(d - x) (B) y = m(x - d) (C) y = m(x + d) (D) y = mx + d

25. If the area of the triangle with vertices (x, 0), (1, 1) and (0, 2) is 4 square unit, then the value of x is:
(A) -2 (B) -4 (C) -6 (D) 8

26. If the two lines are perpendicular then difference of their inclination angle is:
(A) 45° (B) 60° (C) 90° (D) 180°

27. The medians AD and BE of a triangle with vertices A(0, b), B(0, 0) and C(a, 0) are perpendicular to each other, if
(A) $a = \frac{b}{2}$ (B) $b = \frac{a}{2}$ (C) $ab = 1$ (D) $a = \pm\sqrt{2}b$

28. In what ratio does the line y - x + 2 = 0 cut the line joining (3, -1) and (8, 9)?
(A) 2 : 3 (B) 3 : 2 (C) 3 : -2 (D) 1 : 2

29. Slope of a line is given by if inclination of line is α:
(A) $\sin\alpha$ (B) $\cos\alpha$ (C) $\tan\alpha$ (D) $\cot\alpha$

30. If (-4, 5) is one vertex and 7x - y + 8 = 0 is onediagonal of a square, then the equation of second diagonal is:
(A) x + 3y = 21 (B) 2x - 3y = 7 (C) x + 7y = 31 (D) 2x + 3y = 21

31. 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) $\frac{4}{3}$

32. If P (1, 2), Q (3, 5), R (7, 9) form a triangle then find the equation of median through P:
(A) 5x - 4y + 3 = 0 (B) 5x + 4y + 3 = 0 (C) 5x - 4y - 3 = 0 (D) 5x + 4y - 3 = 0

33. If the two lines with slope m_1 and m_2 are perpendicular then their slopes has relation:
(A) $m_1 + m_2 = 1$ (B) $m_1 \times m_2 = 1$ (C) $m_1 \times m_2 = -1$ (D) $m_1 + m_2 = -1$

34. If the points A (1, 2), B (2, 4) and C (3, a) are collinear, what is the length BC?

(A) 2 unit (B) 3 unit (C) 5 unit (D) 5 unit

35. Find slope of line passing through origin and (3, 6):

(A) 2 (B) 3 (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

36. Choose the correct answer.
The tangent of angle between the lines whose intercepts on the axes are a, -b and b, -a, respectively, is

(A) $\frac{a^2-b^2}{ab}$ (B) $\frac{b^2-a^2}{2}$ (C) $\frac{b^2-a^2}{2ab}$ (D) None of these.

37. If slope of a line is $\frac{2}{3}$ then find the slope of line perpendicular to it:

(A) $\frac{-3}{2}$ (B) $\frac{3}{2}$ (C) $\frac{2}{3}$ (D) $\frac{-2}{3}$

38. Three vertices of a parallelogram taken in order are (-1, -6), (2, -5) and (7, 2). The fourth vertex is:

(A) (1, 4) (B) (4, 1) (C) (1, 1) (D) (4, 4)

39. Find the equation of line parallel to 4x + y = 2 and pass through (2, 5):

(A) 4x + y - 13 = 0 (B) 4x + y + 13 = 0 (C) 4x - y - 13 = 0 (D) 4x - y + 13 = 0

40. Two lines are said to be perpendicular if the product of their slope is equal to:

(A) -1 (B) 0 (C) 1 (D) $\frac{1}{2}$

41. L is a variable line such that the algebraic sum of the distances of the points (1, 1), (2, 0) and (0, 2) from the line is equal to zero. The line L will always pass through:

a. (1, 1)
b. (2, 1)
c. (1, 2)
d. none of these.

42. The equation of line passing through origin $(0,0)$ and point $(a\cos\theta, a\sin\theta)$ is :

(A) $y = x\cos\theta$ (B) $y = x\tan\theta$ (C) $y = x\sin\theta$ (D) $y = x\cot\theta$

43. Equation of line parallel to $3x - 4y = 7$ and passing through origin $(0,0)$ is given by :

(A) $3x - 4y = 1$ (B) $3x - 4y = 0$

(C) $4x - 3y = 1$ (D) $3y - 4x = 0$

44. The length of perpendicular drawn from origin on line $x + \sqrt{3y} = 1$ is p. The value of p is:

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{\sqrt{3}}{2}$ (D) 1

45. If lines $y = mx + 5$ and $3x + 5y = 8$ are mutually perpendicular then the value of m is :

(A) $\frac{5}{3}$ (B) $-\frac{5}{3}$ (C) $-\frac{3}{5}$ (D) $\frac{3}{5}$

46. Equation of line perpendicular to straight line $3x-4y+7=0$ and passing through point $(1,-2)$ is given by :

(A) $4x+3y-2=0$ (B) $4x+3y+2=0$

(C) $4x-3y+2=0$ (D) $4x-3y-2=0$

47. The distance between lines $4x-3y+8=0$ and $3y-4x-6=0$ is given by :

(A) 14 (B) 2 (C) $\frac{14}{5}$ (D) $\frac{2}{5}$

48. Point at lines $3y+x-10=0$ and $2x-5y+13=0$ is:

(A) $(0,0)$ (B) $(6,5)$ (C) $(4,2)$ (D) $(1,3)$

49. If lines $y=mx+c$ and $x=my+c$ are mutually perpendicular then the value of m is :

(A) 1 (B) -1

(C) 0 (D) Cannot be determined

50. Line $x=3, y=4$ and $4x-3y+a=0$ are coincidence, then the value of a is :

(A) 12 (B) -12 (C) 0 (D) -7

51. If lines $a_1x-b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ are mutually perpendicular then :

(A) $a_1b_2+a_2b_1=0$ (B) $a_1a_2+b_1b_2=0$

(C) $a_1b_2-a_2b_1=0$ (D) $a_1a_2-b_1b_2=0$

52. The image of point $(3,8)$ in line $x+2y-7=0$ is given by:

(A) $(-1,-4)$ (B) $(-3,-8)$ (C) $(1,-4)$ (D) $(3,8)$

53. If line passing through point $(4,3)$ and $(2,k)$ is perpendicular to the line $y=2x+3$, then k equals to :

(A) 2 (B) 3 (C) 4 (D) 5

54. A line L passes through the points $(1,1)$ and $(2,0)$ and another line L' passes through $\left(\frac{1}{2},0\right)$ and perpendicular to L. Then the area of the triangle formed by the lines L, L' and y- axis, is

(A) $\frac{15}{8}$ (B) $\frac{25}{4}$ (C) $\frac{25}{8}$ (D) $\frac{25}{16}$

55. The sides AB, BC, CD and DA of a quadrilateral are $x+2y=3$, $x=1$, $x-3y=4$, $5x+y+12=0$ respectively. The angle between diagonals AC and BD is .....^{o}

(A) 45 (B) 60 (C) 90 (D) 30

56. If A is $(2,5)$, B is $(4,-11)$ and C lies on $9x+7y+4=0$, then the locus of the centroid of the ΔABC is a straight line parallel to the straight line is

(A) $7x-9y+4=0$ (B) $9x-7y-4=0$ (C) $9x+7y+4=0$ (D) $7+9y+4=0$

57. A point moves so that square of its distance from the point $(3,-2)$ is numerically equal to its distance from the line $5x-12y=13$. The equation of the locus of the

point is

(A) $13x^2+13y^2-83x+64y+182=0$ (B) $x^2+y^2-11x+16y+26=0$

(C) $x^2+y^2-11x+16y=0$ (D) None of these

58. The equation to the sides of a triangle are $x-3y=0$, $4x+3y=5$ and $3x+y=0$. The line $3x-4y=0$ passes through

(A) The incentre (B) The centroid

(C) The circumcentre (D) The orthocentre of the triangle

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

(A) $4/\sqrt{15}$ (B) $2/\sqrt{15}$ (C) $4/3\sqrt{3}$ (D) $1/\sqrt{5}$

60. $A(-1,1)$, $B(5,3)$ are opposite vertices of a square in xy-plane. The equation of the other diagonal (not passing through (A,B) of the square is given by

(A) $x-3y+4=0$ (B) $2x-y+3=0$ (C) $y+3x-8=0$ (D) $x+2y-1=0$

61. The opposite angular points of a square are $(3,\ 4)$ and $(1,\ -1)$. Then the co-ordinates of other two points are

(A) $D\left(\frac{1}{2},\ \frac{9}{2}\right)$, $B\left(-\frac{1}{2},\ \frac{5}{2}\right)$ (B) $D\left(\frac{1}{2},\ \frac{9}{2}\right)$, $B\left(\frac{1}{2},\ \frac{5}{2}\right)$

(C) $D\left(\frac{9}{2},\ \frac{1}{2}\right)$, $B\left(-\frac{1}{2},\ \frac{5}{2}\right)$ (D) None of these

62. If the coordinates of the points A, B, C be $(-1,5)$, $(0,0)$ and $(2,2)$ respectively and D be the middle point of BC, then the equation of the perpendicular drawn from B to the line AD is

(A) $x+2y=0$ (B) $2x+y=0$ (C) $x-2y=0$ (D) $2x-y=0$

63. A straight line passes through a fixed point (h,k). The locus of the foot of perpendicular on it drawn from the origin is

(A) $x^2+y^2-hx-ky=0$ (B) $x^2+y^2+hx+ky=0$

(C) $3x^2+3y^2+hx-ky=0$ (D) None of these

64. If $(-2,6)$ is the image of the point $(4,2)$ with respect to line $L=0$, then $L=$

(A) $3x-2y+5$ (B) $3x-2y+10$ (C) $2x+3y-5$ (D) $6x-4y-7$

65. The image of a point $A(3,\ 8)$ in the line $x+3y-7=0$, is

(A) $(-1,-4)$ (B) $(-3\ ,\ -8)$ (C) $(1,-4)$ (D) $(3,\ 8)$

66. The coordinates of the foot of the perpendicular from $(x_1,y_1)$to the line $ax+by+c=0$ are

(A) $\left(\frac{b^2x_1-aby_1-ac}{a^2+b^2},\ \frac{a^2y_1-abx_1-bc}{a^2+b^2}\right)$ (B) $\left(\frac{b^2x_1+aby_1+ac}{a^2+b^2},\ \frac{a^2y_1+abx_1+bc}{a^2+b^2}\right)$ (C) $\left(\frac{ax_1+by_1+ab}{a+b},\ \frac{ax_1-by_1-ab}{a+b}\right)$ (D) None of these

67. The coordinates of the foot of the perpendicular from the point $(2,3)$ on the line $y=3x+4$ are given by

(A) $\left(\frac{37}{10},-\frac{1}{10}\right)$ (B) $\left(-\frac{1}{10},\frac{37}{10}\right)$ (C) $\left(\frac{10}{37},-10\right)$ (D) $\left(\frac{2}{3},-\frac{1}{3}\right)$

68. If the lines $ax+2y+1=0, bx+3y+1=0$ and $cx+4y+1=0$ are concurrent, then a, b, c are in

(A) $A.P.$ (B) $G.P$ (C) $H.P.$ (D) None of these

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. Let α be the distance between the lines $-x+y=2$ and $x-y=2$, and β be the distance between the lines $4x-3y=5$ and $6y-8x=1$, then

(A) $20\sqrt{2}\beta=11\alpha$ (B) $20\sqrt{2}\alpha=11\beta$ (C) $11\sqrt{2}\beta=20\alpha$ (D) None of these

71. $(\sin\theta,\cos\theta)$ and $(3,\ 2)$ lies on the same side of the line $x+y=1$, then θ lies between

(A) $(0,\ \pi/2)$ (B) $(0,\ \pi)$ (C) $(\pi/4,\pi/2)$ (D) $(0,\ \pi/4)$

72. The ratio in which the line $3x+4y+2=0$ divides the distance between $3x+4y+5=0$ and $3x+4y-5=0$, is

(A) $7:3$ (B) $3:7$ (C) $2:3$ (D) None of these

73. If straight lines $\alpha^2x+\alpha y=9$ and $3x+2y=5$ are perpendicular, then the value of α is

(A) $-2/3$ (B) 0 (C) $-3/2$ (D) $2/3$

74. The straight line passing through the point of intersection of the straight lines $x-3y+1=0$ and $2x+5y-9=0$ and having infinite slope and at a distance of $2\,units$ from the origin, has the equation

(A) $x=2$ (B) $3x+y-1=0$ (C) $y=1$ (D) None of these

75. The point $P(a,\ b)$ lies on the straight line $3x+2y=13$ and the point $Q\ (b,\ a)$ lies on the straight line $4x-y=5$, then the equation of line PQ is

(A) $x-y=5$ (B) $x+y=5$ (C) $x+y=-5$ (D) $x-y=-5$

76. Equation of the line which passes through the point $(-4,\ 3)$ and the portion of the line intercepted between the axes is divided internally in the ratio $5:3$ by this point, is

(A) $9x+20y+96=0$ (B) $20x+9y+96=0$ (C) $9x-20y+96=0$ (D) None of these

77. The equations of the lines passing through the point $(1,0)$ and at a distance $\frac{\sqrt{3}}{2}$ from the origin, are

(A) $\sqrt{3}x+y-\sqrt{3}=0,\ \ \sqrt{3}x-y-\sqrt{3}=0$

(B) $\sqrt{3}x + y + \sqrt{3} = 0,\ \sqrt{3}x - y + \sqrt{3} = 0$

(C) $x + \sqrt{3}y - \sqrt{3} = 0,\ x - \sqrt{3}y - \sqrt{3} = 0$

(D) None of these

78. A line passes through the point $(3,4)$ and cuts off intercepts from the coordinates axes such that their sum is 14. The equation of the line is

(A) $4x - 3y = 24$ (B) $4x + 3y = 24$ (C) $3x - 4y = 24$ (D) $3x + 4y = 24$

79. If the transversal $y = m_r x; r = 1, 2, 3$ cut off equal intercepts on the transversal $x + y = 1$, then $1 + m_1,\ 1 + m_2,\ 1 + m_3$ are in

(A) $A.P.$ (B) $G.P.$ (C) $H.P.$ (D) None of these

80. If the coordinates of the points A and B be $(3,3)$ and $(7,6)$, then the length of the portion of the line AB intercepted between the axes is

(A) $\frac{5}{4}$ (B) $\frac{\sqrt{10}}{4}$ (C) $\frac{\sqrt{13}}{3}$ (D) None of these

*** Given section consists of questions of 2 marks each.** **[62]**

81. Find the value of x for which the points (x, -1)(2, 1) and (4, 5) are collinear.
82. Find the equation of the line which satisfy the given conditions:
Passing through $(2, 2\sqrt{3})$ and inclined with the x-axis at an angle of 75°.
83. Find the equation of the line which satisfy the given condition:
The line passing through the points (-1, 1) and (2, - 4).
84. Find the equation of the line which satisfy the given condition:
Perpendicular distance from the origin is 5 units and the angle made by the perpendicular with the positive X-axis is 30°.
85. Find the distance between parallel lines. l(x + y) + p = 0 and l(x + y) - r = 0
86. Find the equation of the line perpendicular to the line x - 7y + 5 = 0 and having x intercept 3.
87. Find the angles between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1$
88. The line through the points (h, 3) and (4, 1) intersects the line 7x - 9y - 19 = 0 at right angle. Find the value of h.
89. Prove that the line through the point (x_1, y_1) and parallel to the line Ax + By + C = 0 is $A(x - x_1) + B(y - y_1) = 0$.
90. Find the values of θ and p, if the equation $x\cos\theta + y\sin\theta = p$ is the normal form of the line $\sqrt{3}x + y + 2 = 0$
91. What are the points on the y-axis whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1$ is 4 units.

92. Find the value of p so that three lines 3x + y - 2 = 0, px + 2y - 3 = 0 and 2x - y - 3 = 0 may intersect at one point.
93. Find the equation of the line, which makes intercepts –3 and 2 on the x- and y-axes respectively.
94. Find the equation of the line whose perpendicular distance from the origin is 4 units and the angle which the normal makes with positive direction of x-axis is 15°.
95. The Fahrenheit temperature F and absolute temperature K satisfy a linear equation. Given that K = 273 when F = 32 and that K = 373 when F = 212. Express K in terms of F and find the value of F, when K = 0
96. Reduce the equation $\sqrt{3}x + y - 8 = 0$ into normal form. Find the values of p and ω
97. Find the angle between the lines $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0$.
98. Find the equation of a line perpendicular to the line x - 2y + 3 = 0 and passing through the point (1, – 2).
99. If the lines 2x + y - 3 = 0, 5x + ky - 3 = 0, 3x - y - 2 = 0 are concurrent, find the value of k.
100. By using the concept of slope, show that the points (-2, -1), (4, 0), (3, 3) and (-3, 2) are the vertices of a parallelogram.
101. Find the equation of the line on which the length of the perpendicular segment from the origin to the line is 4 and the inclination of the perpendicular segment with the positive direction of x-axis is 30°.
102. Reduce the equation $\sqrt{3}\mathrm{x} + \mathrm{y} + 2 = 0$ to:
Intercept form and find intercept on the axes;
103. State whether the two lines in the following are parallel, perpendicular or neither.
Through (5, 6) and (2, 3); through (9, -2) and (6, -5)
104. Reduce the equation $\sqrt{3}\mathrm{x} + \mathrm{y} + 2 = 0$ to:
slope-intercept form and find slope and y-intercept;
105. Without using Pythagoras theorem, show that the points A(0, 4), B(1, 2) and C(3, 3) are the vertices of a right angled triangle.
106. Draw the lines x = -3, x = 2, y = -2, y = 3 and write the coordinates of the vertices of the square so formed.
107. A straight line passes through the point (α, β) and this point bisects the portion of the line intercepted between the axes. Show that the equation of the straight line is $\frac{\mathrm{x}}{2\alpha} + \frac{\mathrm{y}}{2\beta} = 1$.

108. The equation of the line that passes through P (x_1, y_1) and makes an angle of θ with the x-axis is $\frac{x-x_1}{\cos\theta} = \frac{y-y_1}{\sin\theta}$.

109. If the straight line through the point P (3, 4) makes an angle $\frac{\pi}{6}$ with the x-axis and meets the line 12x + 5y + 10 = 0 at Q, find the length PQ.

110. Prove that the points (-4, -1), (-2, -4), (4, 0) and (2, 3) are the vertices of a rectangle.

111. Find the equation of a line for which:
$p = 8, \alpha = 300^\circ$

*** Given section consists of questions of 3 marks each.** **[69]**

112. If p and q are the length of perpendiculars from the origin to the lines $x\cos\theta - y\sin\theta = k\cos 2\theta$ and $x\sec\theta + y\,cosec\theta = k$ respectively, prove that $p^2 + 4q^2 = k^2$.

113. Find the perpendicular distance from the origin of the line joining the points $(\cos\theta, \sin\theta)$ and $(\cos\phi, \sin\phi)$.

114. Find the equation of a line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point where it meets the Y-axis.

115. The hypotenuse of a right-angled triangle has its ends at the points (1, 3) and (-4, 1). Find the equation of the legs (perpendicular sides) of the triangle.

116. A ray of light passing through the point (1, 2) reflects on the x-axis at point A and the reflected ray passes through the point (5, 3). Find the coordinates of A.

117. Prove that the product of the lengths of the perpendiculars drawn from the points $\left(\sqrt{a^2 - b^2}, 0\right)$ and $\left(-\sqrt{a^2 - b^2}, 0\right)$ to the line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$ is b^2.

118. Find the distance of the line 4x – y = 0 from the point P (4, 1) measured along the line making an angle of 135° with the positive x-axis.

119. Assuming that straight lines work as the plane mirror for a point, find the image of the point (1, 2) in the line x – 3y + 4 = 0

120. Show that the area of the triangle formed by the lines $y = m_1 x + c_1$, $y = m_2 x + c_2$ and x = 0 is $\frac{(c_1 - c_2)^2}{2|m_1 - m_2|}$

121. Find the length of the perpendicular from the origin to the straight line joining the two points whose coordinates are $(a\cos\alpha, a\sin\alpha)$ and $(a\cos\beta, a\sin\beta)$.

122. Find the equation of the straight line which passes through the point (-3, 8) and cuts off positive intercepts on the coordinate axes whose sum is 7.

123. Point R (h, k) divides a line segment between the axes in the ratio 1 : 2. Find the equation of the line.

124. Find the equation of the straight line on which the length of the perpendicular from the origin makes an angle of 30° with x-axis and which forms a triangle of area $\frac{50}{\sqrt{3}}$ with the axes.

125. Find the equation of the straight line at a distance of 3 units from the origin such that the perpendicular from the origin to the line makes an angle $\tan^{-1}\left(\frac{5}{12}\right)$ with the positive direction of x-axis.

126. Find the value of θ and p, if the equation $\mathrm{x}\cos\theta + \mathrm{y}\sin\theta = \mathrm{p}$ is the normal form of the line $\sqrt{3}\mathrm{x} + \mathrm{y} + 2 = 0$.

127. Find the equation of the straight line which makes a triangle of area $96\sqrt{3}$ with the axes and perpendicular from the origin to it makes an angle of 30° with Y-axis.

128. Show that the tangent of an angle between the lines $\frac{\mathrm{x}}{\mathrm{a}} + \frac{\mathrm{y}}{\mathrm{b}} = 1$ and $\frac{\mathrm{x}}{\mathrm{a}} - \frac{\mathrm{y}}{\mathrm{b}} = 1$ is $\frac{2\mathrm{ab}}{\mathrm{a}^2 - \mathrm{b}^2}$.

129. If p is the length of perpendicular from the origin on the line $\frac{\mathrm{x}}{\mathrm{a}} + \frac{\mathrm{y}}{\mathrm{b}} = 1$ and a^2, p^2, b^2 are in A.P, then show that $a^4 + b^4 = 0$.

130. For what values of a and b the intercepts cut off on the coordinate axes by the line ax + by + 8 = 0 are equal in length but opposite in signs to those cut off by the line 2x - 3y + 6 = 0 on the axes.

131. Find the equation of the lines which passes through the point (3, 4) and cuts off intercepts from the coordinate axes such that their sum is 14.

132. Match the questions given under Column C_1 with their appropriate answers given under the Column C_2:

	Column C_1		**Column C_2**
(a)	The coordinates of the points P and Q on the line x + 5y = 13 which are at a distance of 2 units from the line 12x - 5y + 26 = 0 are	(i)	$(3,1),(-7,11)$
(b)	The coordinates of the point on the line x + y = 4, which are at a unit distance from the line 4x + 3y - 10 = 0 are	(ii)	$-\frac{1}{3}, \frac{11}{3}, \frac{4}{3}, \frac{7}{3}$
(c)	The coordinates of the point on the line joining A (-2, 5) and B (3, 1) such that AP = PQ = QB are	(iii)	$1, \frac{12}{5}, -3, \frac{16}{5}$

133. Find the equation of lines passing through point $(0,a)$ on which the perpendicular drawn from the point $(2a,2a)$ is of length a.

134. Find the image of point $(2,3)$ w.r.t. line $x - 2y + 1 = 0$.

*** Given section consists of questions of 5 marks each.**

135. Find the equation of the line passing through the point of intersection of the lines 4x + 7y - 3 = 0 and 2x - 3y + 1 = 0 that has equal intercepts on the axis.

136. Show that the equation of the line passing through the origin and making an angle θ with the line y = mx + c is $\frac{y}{x} = \frac{m \pm \tan\theta}{1 \mp m\tan\theta}$.

137. Find equation of the line through the point (0, 2) making an angle $\frac{2\pi}{3}$ with the positive x-axis. Also, find the equation of line parallel to it an crossing the y-axis at a distance of 2 units below the origin.

138. In the triangle ABC with vertices A(2, 3), B (4, -1) and C (1, 2) find the equation and length of altitude from the vertex A.

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

140. Find the equations to the sides of an isosceles right angled triangle the equation of whose hypotenues is 3x + 4y = 4 and the opposite vertex is the point (2, 2).

141. Find the image of the point (3, 8) with respect to the line x + 3y = 7 assuming the line to be a plane mirror.

142. Find the equations of two straight lines passing through (1, 2) and making an angle of 60° with the line x + y = 0. Find also the area of the triangle formed by the three lines.

143. Prove that the following sets of three lines are concurrent:
$\frac{x}{a} + \frac{y}{b} = 1, \frac{x}{b} + \frac{y}{a} = 1$ and $y = x$.

144. If the image of the point (2, 1) with respect to the line mirror be (5, 2), find the equation of the mirror.

145. Find the projection of the point (1, 0) on the line joining the points (-1, 2) and (5, 4).

146. Show that the area of the triangle formed by the lines $y = m_1x$, $y = m_2x$ and y = c is equal to $\frac{c^2}{4}(\sqrt{33} + \sqrt{11})$, , where m_1, m_2 are the roots of the equation $x^2 + (\sqrt{3} + 2)x + \sqrt{3} - 1 = 0$.

147. Prove that the family of lines represented by $x(1 + \lambda) = y(2 - \lambda) + 5 = 0$, λ being arbitrary, pass through a fixed point. Also, find that point.

148. If a, b, c are in A.P., prove that the straight lines ax + 2y + 1 = 0, bx + 3y + 1 = 0 and cx + 4y + 1 = 0 are concurrent.

149. The line through (h, 3) and (4, 1) intersects the line 7x - 9y - 19 = 0 at right angle. Find the value of h.

150. Find the equation of the bisector of angle A of the triangle whose vertices are A (4, 3), B(0, 0) and C (2, 3).

151. Find the angles between the following pairs of straight lines:

$(m^2 - mn)y = (mn + n^2)x + n^3$ and $(mn + m^2)y = (mn - n^2)x + m^3$.

152. Find the equation of the straight lines passing through the following pair of points:

$\left(at_1, \frac{a}{t_1}\right)$ and $\left(at_2, \frac{a}{t_2}\right)$

153. Prove that the perpendicular drawn from the point (4, 1) on the join of (2, -1) and (6, 5) divides it in the ratio 5:8.

154. If the length of the perpendicular from the point (1, 1) to the line ax - by + c = 0 be unity, show that $\frac{1}{c} + \frac{1}{a} - \frac{1}{b} = \frac{c}{2ab}$.

155. The perpendicular distance of a line from the origin is 5 units and its slope is -1. Find the equation of the line.

156. Find the equation of a line which is perpendicular to the line $\sqrt{3}x - y + 5 = 0$ and which cuts off an intercept of 4 units with the negative direction of y-axis.

157. Find the equations of the two straight lines through (1, 2) forming two sides of a square of which 4x + 7y = 12 is one diagonal.

158. Find the values of α so that the point $p(\alpha^2, \alpha)$ lies inside or on the triangle formed by the lines x - 5y + 6 = 0, x - 3y + 2 = 0 and x - 2y - 3 = 0.

159. In what direction should a line be drawn through the point (1, 2) so that its point of intersection with the line x + y = 4 is at a distance $\frac{\sqrt{6}}{3}$ from the given point.

160. Find the equation of one of the sides of an isosceles right angled triangle whose hypotenuse is given by 3x + 4y = 4 and the opposite vertex of the hypotenuse is (2, 2).

161. P_1, P_2 are points on either of the two lines $y - \sqrt{3}|x| = 2$ at a distance of 5 units from their point of intersection. Find the coordinates of the foot of perpendiculars drawn from P1 , P2 on the bisector of the angle between the given lines.

[**Hint:** Lines are $y = \sqrt{3}x + 2$ and $y = -\sqrt{3}x + 2$ according as $x \geq 0$ or x < 0. y-axis is the bisector of the angles between the lines. P_1, P_2 are the points on these lines at a distance of 5 units from the point of intersection of these lines which have a point on y-axis as common foot of perpendiculars from these points. The y-coordinate of the foot of the perpendicular is given by $2 + 5\cos 30^\circ$.]

----- the journey of thousands miles begins with a single step -----