EXERCISE-I

Slope of line, Equations of line in different forms

1. 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

2. If the coordinates of the points *A, B, C, D,* be (a, b), (a', b'), $(-a, b)$ and $(a', -b')$ respectively, then the equation of the line bisecting the line segments *AB* and *CD* is

(A) $2a'y - 2bx = ab - a'b'$

(B) $2ay - 2b'x = ab - a'b'$

(C) $2ay - 2b'x = a'b - ab'$

(D) None of these

3. The equation of the straight line passing through the point (3, 2) and perpendicular to the line $y = x$ is

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

(C) $x + y = 1$ (D) $x - y = 1$

4. If the coordinates of *A* and *B* be (1, 1) and (5, 7), then the equation of the perpendicular bisector of the line segment *AB* is

(A) $2x + 3y = 18$ (B) $2x - 3y + 18 = 0$

(C) $2x + 3y - 1 = 0$ (D) $3x - 2y + 1 = 0$

5. 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) $2x - y = 0$

6. The equation of the line passing through the point (x', y') and perpendicular to the line $yy' = 2a(x + x')$ is

(A) $xy' + 2ay + 2ay' - x'y' = 0$

(B) $xy' + 2ay - 2ay' - x'y' = 0$

(C) $xy' + 2ay + 2ay' + x'y' = 0$

(D) $xy' + 2ay - 2ay' + x'y' = 0$

7. If the middle points of the sides *BC, CA* and *AB* of the triangle *ABC* be (1, 3), (5, 7) and (– 5, 7), then the equation of the side *AB* is

(A) $x - y - 2 = 0$ (B) $x - y + 12 = 0$

(C) $x + y - 12 = 0$ (D) None of these

8. If the coordinates of the vertices of the triangle ABC be (–1, 6), (–3, –9), and (5, –8) respectively, then the equation of the median through *C* is

(A) $13x - 14y - 47 = 0$

(B) $13x - 14y + 47 = 0$

(C) $13x + 14y + 47 = 0$

(D) $13x + 14y - 47 = 0$

9. The equation of the line perpendicular to the line $\frac{x}{a} - \frac{y}{b} = 1$ and passing through the point at which it cuts *x*–axis, is

(A) $\frac{x}{a} + \frac{y}{b} + \frac{a}{b} = 0$ (B) $\frac{x}{b} + \frac{y}{a} = \frac{b}{a}$

(C) $\frac{x}{b} + \frac{y}{a} = 0$ (D) $\frac{x}{b} + \frac{y}{a} = \frac{a}{b}$

10. The equation of the line passing through the point (1, 2) and perpendicular to the line $x + y + 1 = 0$ is

(A) $y - x + 1 = 0$ (B) $y - x - 1 = 0$

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

11. The equation of a line through the intersection of lines $x=0$ and $y=0$ and through the point (2, 2), is

(A) $y=x-1$ (B) $y=-x$

(C) $y=x$ (D) $y=-x+2$

12. Equation of a line through the origin and perpendicular to, the line joining (*a,* 0) and (– *a,* 0), is

(A) $y=0$ (B) $x=0$

(C) $x=-a$ (D) $y=-a$

13. For specifying a straight line how many geometrical parameters should be known

(A) 1 (B) 2

(C) 4 (D) 3

14. The points *A* (1, 3) and *C* (5, 1) are the opposite vertices of rectangle. The equation of line passing through other two vertices and of gradient 2, is

(A) $2x+y-8=0$ (B) $2x-y-4=0$

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

15. The intercept cut off from *y*–axis is twice that from *x*–axis by the line and line is passes through (1, 2) then its equation is

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

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

16. The equation of line, which bisect the line joining two points (2, – 19) and (6, 1) and perpendicular to the line joining two points (– 1, 3) and (5, – 1), is

(A) $3x-2y=30$ (B) $2x-y-3=0$

(C) $2x+3y=20$ (D) None of these

17. The equation of line whose mid point is (x_1, y_1) in between the axes, is

(A) $\frac{x}{x_1}+\frac{y}{y_1}=2$ (B) $\frac{x}{x_1}+\frac{y}{y_1}=\frac{1}{2}$

(C) $\frac{x}{x_1}+\frac{y}{y_1}=1$ (D) None of these

18. The equation of line passing through (*c, d*) and parallel to $ax+by+c=0$, is

(A) $a(x+c)+b(y+d)=0$

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

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

(D) None of these

19. The equation of line passing through point of intersection of lines $3x-2y-1=0$ and $x-4y+3=0$ and the point $(\pi, 0)$, is

(A) $x-y=\pi$ (B) $x-y=\pi(y+1)$

(C) $x-y=\pi(1-y)$ (D) $x+y=\pi(1-y)$

20. A line perpendicular to the line $ax+by+c=0$ and passes through (a, b). The equation of the line is

(A) $bx-ay+(a^2-b^2)=0$

(B) $bx-ay-(a^2-b^2)=0$

(C) $bx-ay=0$

(D) None of these

21. The equation of the line which cuts off the intercepts $2a\sec\theta$ and $2a\,\text{cosec}\,\theta$ on the axes is

(A) $x\sin\theta+y\cos\theta-2a=0$

(B) $x\cos\theta+y\sin\theta-2a=0$

(C) $x\sec\theta+y\,\text{cosec}\theta-2a=0$

(D) $x\,\text{cosec}\theta+y\sec\theta-2a=0$

22. If the equation $y=mx+c$ and $x\cos\alpha+y\sin\alpha=p$ represents the same straight line, then

(A) $p=c\sqrt{1+m^2}$ (B) $c=p\sqrt{1+m^2}$

(C) $cp=\sqrt{1+m^2}$ (D) $p^2+c^2+m^2=1$

23. The equation to the straight line passing through the point of intersection of the lines $5x-6y-1=0$ and $3x+2y+5=0$ and perpendicular to the line $3x-5y+11=0$ is

(A) $5x+3y+8=0$ (B) $3x-5y+8=0$

(C) $5x+3y+11=0$ (D) $3x-5y+11=0$

24. Line passing through (1, 2) and (2, 5) is

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

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

25. Equation of line passing through (1, 2) and perpendicular to $3x + 4y + 5 = 0$ is

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

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

26. The number of lines that are parallel to $2x + 6y + 7 = 0$ and have an intercept of length 10 between the coordinate axes is

(A) 1 (B) 2

(C) 4 (D) Infinitely many

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

(A) $1/3$ (B) $2/3$

(C) 1 (D) $4/3$

28. A straight the makes an angle of 135^{o} with the *x*–axis and cuts *y*–axis at a distance – 5 from the origin. The equation of the line is

(A) $2x + y + 5 = 0$ (B) $x + 2y + 3 = 0$

(C) $x + y + 5 = 0$ (D) $x + y + 3 = 0$

29. A straight line through *P*(1, 2) is such that its intercept between the axes is bisected at *P*. Its equation is

(A) $x + 2y = 5$ (B) $x - y + 1 = 0$

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

30. The equation of the straight line joining the point (a, b) to the point of intersection of the lines $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ is

(A) $a^2y - b^2x = ab\,(a - b)$

(B) $a^2y + b^2y = ab\,(a + b)$

(C) $a^2y + b^2x = ab$

(D) $a^2x + b^2y = ab\,(a - b)$

31. Equation of a line passing through (1, –2) and perpendicular to the line $3x - 5y + 7 = 0$ is

(A) $5x + 3y + 1 = 0$ (B) $3x + 5y + 1 = 0$

(C) $5x - 3y - 1 = 0$ (D) $3x - 5y + 1 = 0$

32. 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)

33. If the slope of a line passing through the point *A* (3, 2) be 3/4, then the points on the line which are 5 units away from *A*, are

(A) (5, 5), (– 1, – 1) (B) (7, 5), (– 1, – 1)

(C) (5, 7), (– 1, – 1) (D) (7, 5), (1, 1)

34. For the lines $2x + 5y = 7$ and $2x - 5y = 9$, which of the following statement is true

(A) Lines are parallel

(B) Lines are coincident

(C) Lines are intersecting

(D) Lines are perpendicular

35. 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

36. Two consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation to one diagonal is $11x + 7y = 9$, then the equation of the other diagonal is

(A) $x + 2y = 0$ (B) $2x + y = 0$

(C) $x - y = 0$ (D) None of these

37. One diagonal of a square is along the line $8x - 15y = 0$ and one of its vertex is (1, 2). Then the equation of the sides of the square passing through this vertex, are

(A) $23x + 7y = 9, 7x + 23y = 53$

(B) $23x - 7y + 9 = 0, 7x + 23y + 53 = 0$

(C) $23x - 7y - 9 = 0, 7x + 23y - 53 = 0$

(D) None of these

38. The opposite vertices of a square are (1, 2) and (3, 8), then the equation of a diagonal of the square passing through the point (1, 2), is

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

(C) $3x + y + 1 = 0$ (D) None of these

39. The ends of the base of an isosceles triangle are at $(2a, 0)$ and $(0, a)$. The equation of one side is $x = 2a$ The equation of the other side is

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

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

40. The equation of the lines on which the perpendiculars from the origin make 30° angle with *x*–axis and which form a triangle of area $\frac{50}{\sqrt{3}}$ with axes, are

(A) $x + \sqrt{3}y \pm 10 = 0$ (B) $\sqrt{3}x + y \pm 10 = 0$

(C) $x \pm \sqrt{3}y - 10 = 0$ (D) None of these

41. If *a, b, c* are in harmonic progression, then straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point, that point is

(A) $(-1, -2)$ (B) $(-1, 2)$

(C) $(1, -2)$ (D) $(1, -1/2)$

42. If the straight line $ax + by + c = 0$ always passes through $(1, -2)$, then *a, b, c* are

(A) In A.P. (B) In H.P.

(C) In G.P. (D) None of these

43. If $u = a_1x + b_1y + c_1 = 0$,

$v = a_2x + b_2y + c_2 = 0$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$,

then the curve $u + kv = 0$ is

(A) The same straight line *u*

(B) Different straight line

(C) It is not a straight line

(D) None of these

44. 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

(A) $a = \frac{8}{3}, b = -4$ (B) $a = -\frac{8}{3}, b = -4$

(C) $a = \frac{8}{3}, b = 4$ (D) $a = -\frac{8}{3}, b = 4$

45. 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)

46. Equation of the straight line making equal intercepts on the axes and passing through the point (2, 4) is

(A) $4x - y - 4 = 0$ (B) $2x + y - 8 = 0$

(C) $x + y - 6 = 0$ (D) $x + 2y - 10 = 0$

47. The equation of the straight line passing through the point (4, 3) and making intercepts on the co-ordinate 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 $\frac{x}{-2} + \frac{y}{1} = -1$

48. The line which is parallel to x–axis and crosses the curve $y=\sqrt{x}$ at an angle of 45^o is equal to

(A) $x=\frac{1}{4}$ (B) $y=\frac{1}{4}$

(C) $y=\frac{1}{2}$ (D) $y=1$

49. The equation of the line perpendicular to line $ax+by+c=0$ and passing through (a,b) is equal to

(A) $bx-ay=0$

(B) $bx+ay-2ab=0$

(C) $bx+ay=0$

(D) None of these

50. The points (1, 3) and (5, 1) are the opposite vertices of a rectangle. The other two vertices lie on the line $y=2x+c,$ then the value of c will be

(A) 4 (B) – 4

(C) 2 (D) – 2

Angle between two straight lines, Bisector of angle between two lines

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

(A) Parallel to each other

(B) Perpendicular to each other

(C) Inclined at 45^o to each other

(D) Coincident pair of straight lines

52. The obtuse angle between the lines $y=-2$ and $y=x+2$ is

(A) 120^o (B) 135^o

(C) 150^o (D) 160^o

53. The line passes through (1, 0) and $(-2,\sqrt{3})$ makes an angle of ...... with x–axis

(A) 60^o (B) 120^o

(C) 150^o (D) 135^o

54. Angle between $x=2$ and $x-3y=6$ is

(A) ∞ (B) $\tan^{-1}(3)$

(C) $\tan^{-1}\left(\frac{1}{3}\right)$ (D) None of these

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

(A) 1 (B) 2

(C) – 1 (D) – 2

56. A straight line $(\sqrt{3}-1)x=(\sqrt{3}+1)y$ makes an angle 75^o with another straight line which passes through origin. Then the equation of the line is

(A) $x=0$ (B) $y=0$

(C) $x+y=0$ (D) $x-y=0$

57. The angle between the lines $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0,$ is

(A) $\tan^{-1}\frac{a_1b_2+a_2b_1}{a_1a_2-b_1b_2}$

(B) $\cot^{-1}\frac{a_1a_2+b_1b_2}{a_1b_2-a_2b_1}$

(C) $\cot^{-1}\frac{a_1b_1-a_2b_2}{a_1a_2+b_1b_2}$

(D) $\tan^{-1}\frac{a_1b_1-a_2b_2}{a_1a_2+b_1b_2}$

58. The inclination of the straight line passing through the point (–3, 6) and the midpoint of the line joining the point (4, –5) and (–2, 9) is

(A) $\pi/4$ (B) $\pi/6$

(C) $\pi/3$ (D) $3\pi/4$

59. The angle between the lines $2x-y+3=0$ and $x+2y+3=0$ is

(A) 90^o (B) 60^o

(C) 45^o (D) 30^o

60. The angle between the straight lines $x - y\sqrt{3} = 5$ and $\sqrt{3x} + y = 7$ is

(A) 90^{o} (B) 60^{o}

(C) 75^{o} (D) 30^{o}

61. The lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular to each other, if

(A) $a_1b_2 - b_1a_2 = 0$ (B) $a_1a_2 + b_1b_2 = 0$

(C) $a_1^2b_2 + b_1^2a_2 = 0$ (D) $a_1b_1 + a_2b_2 = 0$

62. The lines $y = 2x$ and $x = -2y$ are

(A) Parallel

(B) Perpendicular

(C) Equally inclined to axes

(D) Coincident

63. If the line passing through (4, 3) and (2, *k*) is perpendicular to $y = 2x + 3$, then $k =$

(A) –1 (B) 1

(C) – 4 (D) 4

64. The number of straight lines which is equally inclined to both the axes is

(A) 4 (B) 2

(C) 3 (D) 1

65. The equation of the bisector of the acute angle between the lines $3x - 4y + 7 = 0$ and $12x + 5y - 2 = 0$ is

(A) $21x + 77y - 101 = 0$

(B) $11x - 3y + 9 = 0$

(C) $31x + 77y + 101 = 0$

(D) $11x - 3y - 9 = 0$

Distance between two lines, Perpendicular distance of the line from a point, Position of point w.r.t. line

66. The distance between two parallel lines $3x + 4y - 8 = 0$ and $3x + 4y - 3 = 0$, is given by

(A) 4 (B) 5

(C) 3 (D) 1

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

(A) $\frac{7}{2}$ (B) 4

(C) $\frac{7}{10}$ (D) None of these

68. 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) $1/\sqrt{5}$

69. The product of the perpendiculars drawn from the points $(\pm\sqrt{a^2 - b^2}, 0)$ on the line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$, is

(A) a^2 (B) b^2

(C) $a^2 + b^2$ (D) $a^2 - b^2$

70. 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

71. If $2p$ is the length of perpendicular from the origin to the lines $\frac{x}{a} + \frac{y}{b} = 1$, then $a^2, 8p^2, b^2$ are in

(A) A. P. (B) G.P.

(C) H. P. (D) None of these

72. The length of the perpendicular drawn from origin upon the straight line $\frac{x}{3} - \frac{y}{4} = 1$ is

(A) $2\frac{2}{5}$ (B) $3\frac{1}{5}$

(C) $4\frac{2}{5}$ (D) $3\frac{2}{5}$

73. The distance between the lines $3x-2y=1$ and $6x+9=4y$ is

(A) $\frac{1}{\sqrt{52}}$ (B) $\frac{11}{\sqrt{52}}$

(C) $\frac{4}{\sqrt{13}}$ (D) $\frac{6}{\sqrt{13}}$

74. Two points *A* and *B* have coordinates (1, 1) and (3, –2) respectively. The co-ordinates of a point distant $\sqrt{85}$ from *B* on the line through *B* perpendicular to *AB* are

(A) (4, 7) (B) (7, 4)

(C) (5, 7) (D) (–5, –3)

75. 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) $5\sqrt{3}$

76. The distance of the lines $2x-3y=4$ from the point (1, 1) measured parallel to the line $x+y=1$ is

(A) $\sqrt{2}$ (B) $\frac{5}{\sqrt{2}}$

(C) $\frac{1}{\sqrt{2}}$ (D) 6

77. Distance between the lines $5x+3y-7=0$ and $15x+9y+14=0$ is

(A) $\frac{35}{\sqrt{34}}$ (B) $\frac{1}{3\sqrt{34}}$

(C) $\frac{35}{3\sqrt{34}}$ (D) $\frac{35}{2\sqrt{34}}$

78. Distance between the parallel lines $3x+4y+7=0$ and $3x+4y-5=0$ is

(A) $\frac{2}{5}$ (B) $\frac{12}{5}$

(C) $\frac{5}{12}$ (D) $\frac{3}{5}$

79. The position of the point (8,–9) with respect to the lines $2x+3y-4=0$ and $6x+9y+8=0$ is

(A) Point lies on the same side of the lines

(B) Point lies on the different sides of the line

(C) Point lies on one of the line

(D) None of these

80. The length of perpendicular from the point $(a\cos\alpha, a\sin\alpha)$ upon the straight line $y=x\tan\alpha+c,\ c>0$ is

(A) $c\cos\alpha$ (B) $c\sin^2\alpha$

(C) $c\sec^2\alpha$ (D) $c\cos^2\alpha$

Concurrency of three lines

81. The value of *k* for which the lines $7x-8y+5=0$, $3x-4y+5=0$ and $4x+5y+k=0$ are concurrent is given by

(A) – 45 (B) 44

(C) 54 (D) – 54

82. For what value of '*a*' the lines $x=3, y=4$ and $4x-3y+a=0$ are concurrent

(A) 0 (B) –1

(C) 2 (D) 3

83. The lines $15x-18y+1=0$, $12x+10y-3=0$ and $6x+66y-11=0$ are

(A) Parallel (B) Perpendicular

(C) Concurrent (D) None of these

84. The straight lines $x+2y-9=0$, $3x+5y-5=0$ and $ax+by-1=0$ are concurrent, if the straight line $35x-22y+1=0$ passes through the point

(A) (a,b) (B) (b,a)

(C) $(-a,-b)$ (D) None of these

85. If the lines $ax + y + 1 = 0, x + by + 1 = 0$ and $x + y + c = 0$ (*a*, *b*, *c* being distinct and different from 1) are concurrent, then $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}=$

(A) 0 (B) 1

(C) $\frac{1}{a+b+c}$ (D) None of these

86. 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

87. The lines $2x + y - 1 = 0, ax + 3y - 3 = 0$ and $3x + 2y - 2 = 0$ are concurrent for

(A) All *a* (B) $a = 4$ only

(C) $-1 \le a \le 3$ (D) $a > 0$ only

88. If lines $4x + 3y = 1, y = x + 5$ and $5y + bx = 3$ are concurrent, then *b* equals

(A) 1 (B) 3

(C) 6 (D) 0

89. Three lines $3x - y = 2$, $5x + ay = 3$ and $2x + y = 3$ are concurrent, then *a* =

(A) 2 (B) 3

(C) –1 (D) –2

90. The three lines $lx + my + n = 0$, $mx + ny + l = 0$, $nx + ly + m = 0$ are concurrent if

(A) $l = m + n$ (B) $m = l + n$

(C) $n = l + m$ (D) $l + m + n = 0$

Foot of perpendicular, Transformation, Pedal points, Image of a point

91. The line $2x + 3y = 12$ meets the *x*-axis at *A* and *y*-axis at *B*. The line through (5, 5) perpendicular to AB meets the *x*- axis, *y*- axis and the AB at *C*, *D* and *E* respectively. If *O* is the origin of coordinates, then the area of OCEB is

(A) 23 *sq. units* (B) $\frac{23}{2}$ sq. *units*

(C) $\frac{23}{3}$ sq. *units* (D) None of these

92. If *A* and *B* are two points on the line $3x + 4y + 15 = 0$ such that $OA = OB = 9$ units, then the area of the triangle OAB is

(A) 18 *sq. units* (B) $18\sqrt{2}$ sq. *units*

(C) $18/\sqrt{2}$ *sq. units* (D) None of these

93. One vertex of the equilateral triangle with centroid at the origin and one side as $x + y - 2 = 0$ is

(A) $(-1, -1)$ (B) $(2, 2)$

(C) $(-2, -2)$ (D) None of these

94. The point (4, 1)undergoes the following two successive transformation

(i) Reflection about the line $y = x$

(ii) Translation through a distance 2 units along the positive *x*-axis

Then the final coordinates of the point are

(A) (4, 3) (B) (3, 4)

(C) (1, 4) (D) $\left(\frac{7}{2}, \frac{7}{2}\right)$

95. Line *L* has intercepts *a* and *b* on the co-ordinate axes. When the axes are rotated through a given angle keeping the origin fixed, the same line *L* has intercepts *p* and *q*, then

(A) $a^2 + b^2 = p^2 + q^2$

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

(C) $a^2 + p^2 = b^2 + q^2$

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

96. The pedal points of a perpendicular drawn from origin on the line $3x + 4y - 5 = 0$, is

(A) $\left(\frac{3}{5}, 2\right)$ (B) $\left(\frac{3}{5}, \frac{4}{5}\right)$

(C) $\left(-\frac{3}{5}, -\frac{4}{5}\right)$ (D) $\left(\frac{30}{17}, \frac{19}{17}\right)$

97. 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) $(3, 8)$

98. The reflection of the point (4,–13) in the line $5x + y + 6 = 0$ is

(A) $(-1, -14)$ (B) (3 ,4)

(C) (1, 2) (D) (– 4, 13)

99. 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) $6x - 4y - 7$

100. 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

Problems related to triangle and quadrilateral, Locus

101. The triangle formed by the lines $x + y - 4 = 0,\ 3x + y = 4,\ x + 3y = 4$ is

(A) Isosceles (B) Equilateral

(C) Right–angled (D) None of these

102. Two lines are drawn through (3, 4), each of which makes angle of 45^o with the line $x - y = 2$, then area of the triangle formed by these lines is

(A) 9 (B) 9/2

(C) 2 (D) 2/9

103. The area of the triangle formed by the line $x \sin\alpha + y\cos\alpha = \sin 2\alpha$ and the coordinates axes is

(A) $\sin 2\alpha$ (B) $\cos 2\alpha$

(C) $2\sin 2\alpha$ (D) $2\cos 2\alpha$

104. The area of a parallelogram formed by the lines $ax \pm by \pm c = 0$, is

(A) $\frac{c^2}{ab}$ (B) $\frac{2c^2}{ab}$

(C) $\frac{c^2}{2ab}$ (D) None of these

105. The triangle formed by $x^2 - 9y^2 = 0$ and $x = 4$ is

(A) Isosceles (B) Equilateral

(C) Right angled (D) None of these

106. 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

107. Locus of the points which are at equal distance from $3x + 4y - 11 = 0$ and $12x + 5y + 2 = 0$ and which is near the origin is

(A) $21x - 77y + 153 = 0$

(B) $99x + 77y - 133 = 0$

(C) $7x - 11y = 19$

(D) None of these

108. A point moves such that its distance from the point $(4, 0)$ is half that of its distance from the line $x = 16$. The locus of this point is

(A) $3x^2 + 4y^2 = 192$ (B) $4x^2 + 3y^2 = 192$

(C) $x^2 + y^2 = 192$ (D) None of these

109. The locus of a point so that sum of its distance from two given perpendicular lines is equal to 2 unit in first quadrant, is

(A) $x + y + 2 = 0$ (B) $x + y = 2$

(C) $x - y = 2$ (D) None of these

110. If the sum of the distances of a point from two perpendicular lines in a plane is 1, then its locus is

(A) Square

(B) Circle

(C) Straight line

(D) Two intersecting lines

Equation of Pair of Straight lines

111. The equation of the perpendiculars drawn from the origin to the lines represented by the equation
$2x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ is
(A) $6x^2 + 5xy + y^2 = 0$
(B) $6y^2 + 5xy + x^2 = 0$
(C) $6x^2 - 5xy + y^2 = 0$
(D) None of these

112. Which of the following second degree equation represented a pair of straight lines
(A) $x^2 - xy - y^2 = 1$
(B) $-x^2 + xy - y^2 = 1$
(C) $4x^2 - 4xy + y^2 = 4$
(D) $x^2 + y^2 = 4$

113. The lines $a^2x^2 + bcy^2 = a(b+c)xy$ will be coincident, if
(A) $a = 0$ or $b = c$ (B) $a = b$ or $a = c$
(C) $c = 0$ or $a = b$ (D) $a = b + c$

114. If the equation $2x^2 - 2hxy + 2y^2 = 0$ represents two coincident straight lines passing through the origin, then $h =$
(A) ± 6 (B) $\sqrt{6}$
(C) $-\sqrt{6}$ (D) ± 2

115. If one of the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ be $y = mx$, then
(A) $bm^2 + 2hm + a = 0$
(B) $bm^2 + 2hm - a = 0$
(C) $am^2 + 2hm + b = 0$
(D) $bm^2 - 2hm + a = 0$

116. If the equation
$\lambda x^2 + 2y^2 - 5xy + 5x - 7y + 3 = 0$
represents two straight lines, then the value of λ will be
(A) 3 (B) 2
(C) 8 (D) – 8

117. The equation of one of the line represented by the equation $x^2 + 2xy\cot\theta - y^2 = 0$, is
(A) $x - y\cot\theta = 0$
(B) $x + y\tan\theta = 0$
(C) $x\sin\theta + y(\cos\theta + 1) = 0$
(D) $x\cos\theta + y(\sin\theta + 1) = 0$

118. The equation of one of the line represented by the equation
$pq(x^2 - y^2) + (p^2 - q^2)xy = 0$, is
(A) $px + qy = 0$ (B) $px - qy = 0$
(C) $p^2x + q^2y = 0$ (D) $q^2x - p^2y = 0$

119. The pair of straight lines passes through the point (1, 2) and perpendicular to the pair of straight lines $3x^2 - 8xy + 5y^2 = 0$, is
(A) $(5x + 3y + 11)(x + y + 3) = 0$
(B) $(5x + 3y - 11)(x + y - 3) = 0$
(C) $(3x + 5y - 11)(x + y + 3) = 0$
(D) $(3x - 5y + 11)(x + y - 3) = 0$

120. If in general quadratic equation $f(x, y) = 0$, $\Delta = 0$ and $h^2 = ab$, then the equation represents
(A) Two parallel straight lines
(B) Two perpendicular straight lines
(C) Two coincident lines
(D) None of these

121. The value of *k* so that the equation
$2x^2 + 5xy + 3y^2 + 6x + 7y + k = 0$
represents a pair of straight lines,
(A) 4 (B) 6
(C) 0 (D) 8

122. If the equation
$3x^2 + xy - y^2 - 3x + 6y + k = 0$ represents a pair of lines, then *k* is equal to
(A) 9 (B) 1
(C) 0 (D) – 9

123. Equation

$3x^2 + 7xy + 2y^2 + 5x + 5y + 2 = 0$

represents

(A) Pair of straight line

(B) Ellipse

(C) Hyperbola

(D) None of these

124. For what value of 'p',

$y^2 + xy + px^2 - x - 2y = 0$ represents two straight lines

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

(C) $\frac{1}{4}$ (D) $\frac{1}{2}$

125. If the equation

$2x^2 + 7xy + 3y^2 - 9x - 7y + k = 0$

represents a pair of lines, then *k* is equal to

(A) 4 (B) 2

(C) 1 (D) – 4

Angle between the pair of straight lines, Condition for parallel and perpendicular lines

126. 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) 3/2

(C) 7/4 (D) 5/4

127. Angle between the line joining the origin to the points of intersection of the curves $2x^2 + 3y^2 + 10x = 0$ and $3x^2 + 5y^2 + 16x = 0$ is

(A) $\tan^{-1}\frac{3}{2}$ (B) $\tan^{-1}\frac{4}{5}$

(C) 90^o (D) None of these

128. The lines $(lx + my)^2 - 3(mx - ly)^2 = 0$ and $lx + my + n = 0$ form

(A) An isosceles triangle

(B) A right angled triangle

(C) An equilateral triangle

(D) None of these

129. The angle between the lines represented by the equation $\lambda x^2 + (1-\lambda)^2 xy - \lambda y^2 = 0$, is

(A) 30^o (B) 45^o

(C) 60^o (D) 90^o

130. If the sum of the slopes of the lines represented by the equation $x^2 - 2xy\tan A - y^2 = 0$ be 4, then $\angle A =$

(A) 0^o (B) 45^o

(C) 60^o (D) $\tan^{-1}(-2)$

131. The equation $x^2 + k_1 y^2 + k_2 xy = 0$ represents a pair of perpendicular lines, if

(A) $k_1 = -1$ (B) $k_1 = 2k_2$

(C) $2k_1 = k_2$ (D) None of these

132. The angle between the pair of lines $2x^2 + 5xy + 2y^2 + 3x + 3y + 1 = 0$ is

(A) $\cos^{-1}\left(\frac{4}{5}\right)$ (B) $\tan^{-1}\left(\frac{4}{5}\right)$

(C) 0 (D) $\pi/2$

133. The straight lines represented by the equation $9x^2 - 12xy + 4y^2 = 0$ are

(A) Coincident

(B) Perpendicular

(C) Parallel

(D) Inclined at an angle of 45°

134. The angle between the two straight lines $2x^2 - 5xy + 2y^2 - 3x + 3y + 1 = 0$ is

(A) 45^o (B) 60^o

(C) $\tan^{-1}\frac{4}{3}$ (D) $\tan^{-1}\frac{3}{4}$

135. The acute angle formed between the lines joining the origin to the points of intersection of the curves $x^2 + y^2 - 2x - 1 = 0$ and $x + y = 1$, is

(A) $\tan^{-1}\left(-\frac{1}{2}\right)$ (B) $\tan^{-1} 2$

(C) $\tan^{-1}\frac{1}{2}$ (D) 60^o

Bisectors of the angle between the lines, Point of intersection of the lines

136. The combined equation of bisectors of angles between coordinate axes, is

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

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

(C) $xy = 0$

(D) $x + y = 0$

137. 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

138. The combined equation of the bisectors of the angle between the lines represented by $(x^2 + y^2)\sqrt{3} = 4xy$ is

(A) $y^2 - x^2 = 0$ (B) $xy = 0$

(C) $x^2 + y^2 = 2xy$ (D) $\frac{x^2 - y^2}{\sqrt{3}} = \frac{xy}{2}$

139. The equation of the bisectors of the angles between the lines represented by $x^2 + 2xy\cot\theta + y^2 = 0$, is

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

(B) $x^2 - y^2 = xy$

(C) $(x^2 - y^2)\cot\theta = 2xy$

(D) None of these

140. If the bisectors of angles represented by $ax^2 + 2hxy + by^2 = 0$ and $a'x^2 + 2h'xy + b'y^2 = 0$ are same, then

(A) $(a - b)h' = (a' - b')h$

(B) $(a - b)h = (a' - b')h'$

(C) $(a + b)h' = (a' - b')h$

(D) $(a - b)h' = (a' + b')h$