Exercise-1

Marked Questions may have for Revision Questions.

*** Marked Questions may have more than one correct option.**

OBJECTIVE QUESTIONS

Section (A) : Coordinate system, Distance formula, Section formula

A-1. Find the distance between points $P\left(2, -\frac{\pi}{6}\right)$ and $Q\left(3, \frac{\pi}{6}\right)$

(1) 7 (2) $\sqrt{7}$ (3) $\sqrt{19}$ (4) 19

A-2. The coordinates of a point are (0, 1) and the ordinate of another point is –3. If the distance between the two point is 5 then the abscissa of another point is-

(1) – 3 (2) 3 (3) ± 3 (4) 1

A-3. The three points (–2, 2), (8, –2) and (– 4, – 3) are the vertices of

(1) an isosceles triangle (2) an equilateral triangle

(3) a right angled triangle (4) none of these

A-4 The quadrilateral formed by the points (a, –b), (0, 0), (–a, b) and (ab, – b2) is -

(1) rectangle (2) parallelogram (3) square (4) None of these

A-5. The points A(–4, –1), B (–2, –4), C (4, 0) and D(2, 3) are the vertices of

(1) square (2) rectangle (3) rhombus (4) None of these

A-6. If (3, – 4) and (–6, 5) are the extremities of the diagonal of a parallelogram and (–2, 1) is its third vertex, then its fourth vertex is -

(1) (–1, 0) (2) (–1, 1) (3) (0, –1) (4) (0, 1)

A-7. If x-axis divides the line joining (3, 4) and (5, 6) in the ratio λ : 1 then λ is-

(1) $-\frac{3}{2}$ (2) $-\frac{2}{3}$ (3) $\frac{3}{4}$ (4) $\frac{1}{3}$

A-8. The points which trisect the line segment joining the points (0, 0) and (9, 12) are

(1) (3, 4), (6, 8) (2) (8, 6), (0, 2) (3) (1, 3) (2, 5) (4) (4, 0), (0, 3)

A-9. A point on the line joining points (0, 4) and (2, 0) dividing the line segment externally in ratio 3 : 2, is -

(1) (3, –4) (2) (6, – 8) (3) $\left(\frac{3}{5}, \frac{8}{5}\right)$ (4) $\left(\frac{8}{5}, \frac{3}{5}\right)$

A-10. P and Q are points on the line goining A(–2,5) and B (3,1) such that AP= PQ = QB. Then the mid point of PQ.

(1) $\left(\frac{1}{2}, 3\right)$ (2) $\left(-\frac{1}{2}, 4\right)$ (3) (2, 3) (4) (1, 4)

A-11. The ratio in which the join of the points (1, 2) and (– 2, 3) is divided by the line 3x +4y = 7 is-

(1) 4 : 1 (2) 3 : 2 (3) 3 : 1 (4) 7 : 3

A-12. Find the harmonic conjagate of point R(2,4) with respect to the points P(2,2) and Q (2,5).

(1) (4, 2) (2) (–2, 3) (3) (2, 8) (4) (8, 2)

Section (B) : Area of triangle, Locus, Change of origin, Slope of line, Collinearty

B-1. The area of the triangle formed by the mid points of sides of the triangle whose vertices are (2, 1), (– 2, 3), (4, – 3) is -
(1) 1.5 sq. units (2) 3 sq. units (3) 6 sq. units (4) 12 sq. units

B-2. The vertices of a triangle ABC are $(\lambda, 2-2\lambda)$, $(-\lambda+1, 2\lambda)$ and $(-4-\lambda, 6-, 2\lambda)$. If its area be 10 units then number of integral values of λ is
(1) 1 (2) 2 (3) 3 (4) 4

B-3. Line segment joining (5, 0) and $(10\cos\theta, 10\sin\theta)$ is divided by a point P in ratio 2 : 3. If θ varies then locus of P is -
(1) $(x-3)^2 + y^2 = 16$ (2) $(x+3)^2 + y^2 = 16$ (3) $y^2 = 4x$ (4) $y = 5x + 12$

B-4. A rod of length ℓ slides with its ends on two perpendicular lines. Find locus of its mid points.
(1) $x^2 + y^2 = \ell^2$ (2) $x^2 + y^2 = \frac{\ell^2}{4}$ (3) $2x^2 + 2y^2 = \ell^2$ (4) $x^2 + y^2 = 2\ell^2$

B-5. Find the locus of a point which moves so that sum of the squares of its distance from the axes is equal to 3.
(1) $x^2 + y^2 = 9$ (2) $x^2 + y^2 + = 3$ (3) $|x|+|y|=3$ (4) $x^2 - y^2 = 3$

B-6. At what point should the origin be shifted if the coordinates of a points (9, 5) become (– 3, 9)
(1) (–12,4) (2) (– 4, 7) (3) (7, – 4) (4) (12, – 4)

B-7. Find the new position of origin so that equation $x^2 + 4x + 8y - 2 = 0$ will not contain a term in x and the costant term.
(1) $\left(\frac{3}{4}, 4\right)$ (2) $\left(\frac{3}{4}, -2\right)$ (3) $\left(-2, \frac{3}{4}\right)$ (4) $\left(-2, -\frac{3}{4}\right)$

B-8. If A (2, 3), B(3, 1) and C(5, 3) are three points, then the slope of the line passing through A and bisecting BC is -
(1) 1/2 (2) – 2 (3) –1/2 (4) 2

B-9. Slope of line joining points (5, 3) and $(k^2, k + 1)$ is 1/2, then k is
(1) 1 (2) $1 + \sqrt{2}$ (3) $\sqrt{2} - 1$ (4) $-1 - \sqrt{2}$

B-10. If the points (k, 2 – 2k), (1 – k, 2k) and (–k –4, 6 – 2k) are collinear, then possible values of k are
(1) $-\frac{1}{2}, 1$ (2) $\frac{1}{2}, -1$ (3) 1, 2 (4) 1, 3

Section (C) : Various forms of straight line , Point and line, Angle between two lines

C-1. The equation of a line passing through the origin and the point $(a\cos\theta, a\sin\theta)$ is-
(1) $y = x\sin\theta$ (2) $y = x\tan\theta$ (3) $y = x\cos\theta$ (4) $y = x\cot\theta$

C-2. If the point (5, 2) bisects the intercept of a line between the axes, then its equation is-
(1) 5x + 2y = 20 (2) 2x + 5y = 20 (3) 5x – 2y = 20 (4) 2x – 5y = 20

C-3. Equation to the straight line cutting off an intercept unity from the positive direction of the axis of y and inclined at 45° to the axis of X is -

(1) $x + y + 1 = 0$ (2) $x - y + 1 = 0$ (3) $x - y - 1 = 0$ (4) $x - y + 2 = 0$

C-4. If a straight line passing through (x_1, y_1) and its segment between the axes is bisected at this point, then its equation is given by

(1) $\frac{x}{x_1} + \frac{y}{y_1} = 1$ (2) $\frac{x}{x_1} + \frac{y}{y_1} = 2$ (3) $xy_1 + yx_1 = 1$ (4) $2(xy_1 + yx_1) = x_1y_1$

C-5. Slope of line bisecting the angle between co-ordinate axes, is

(1) ±3 (2) ±2 (3) ±1 (4) ±5

C-6. Find equation of a straight line on which length of perpendicular from the origin is four units and the line makes an angle of 120º with the positive direction of x-axis.

(1) $\sqrt{3}\,x - y = 0$ (2) $\sqrt{3}\,x + y = 8$ (3) $x + \sqrt{3}\,y = 8$ (4) $x - \sqrt{3}\,y = 8$

C-7. The point (–4,5) is the vertex of a square and one of its digonals is $7x-y+8 = 0$. The equation of the othere diagonals is

(1) $7x-y+23 = 0$ (2) $7y + x = 30$ (3) $7y + x = 31$ (4) $x - 7y = 30$

C-8. The points A (1, 3) and C (5,1) are the oppositive vertices of rectangle. The equation of line passing through other two vertices and of gradient 2, is

(1) $2x+y-8 = 0$ (2) $2x-y-4 = 0$ (3) $2x-y+4 = 0$ (4) $2x + y+4 = 0$

C-9. Equation of a straight line passing through the origin and making with x − axis an angle twice the size of the angle made by the line y = (0.2) x with the x − axis, is :

(1) y = (0.4) x (2) y = (5/12) x (3) $6y - 5x = 0$ (4) none of these

C-10. Equation of the line passing through the point (1, – 1) and perpendicular to the line $2x - 3y = 5$ is -

(1) $3x + 2y - 1 = 0$ (2) $2x + 3y + 1 = 0$ (3) $3x + 2y - 3 = 0$ (4) $3x + 2y + 5 = 0$

C-11. If the line passing through the points (4, 3) and (2, λ) is perpendicular to the line y = 2x + 3, then λ is equal to-

(1) 4 (2) – 4 (3) 1 (4) – 1

C-12. The equation of a line parallel to $2x - 3y = 4$ which makes with the axes a triangle of area 12 units, is-

(1) $3x + 2y = 12$ (2) $2x - 3y = 12$ (3) $2x - 3y = 6$ (4) $3x + 2y = 6$

C-13. Area of Δ formed by line $3x + 4y + 12 = 0$ with co-ordinate axis is

(1) 6 (2) 2 (3) 1 (4) 5

C-14. If the middle points of the sides BC, CA and AB of the triangle ABC be (1, 3), (5, 7) and (– 5, 7) respectively then the equation of the side AB is

(1) $x-y-2 = 0$ (2) $x-y+12 = 0$ (3) $x-y-12 = 0$ (4) None of these

C-15. The distance of the point (2, 3) from the line $2x - 3y + 9 = 0$ measured along a line $x - y + 1 = 0$ is :

(1) $5\sqrt{3}$ (2) $4\sqrt{2}$ (3) $3\sqrt{2}$ (4) $2\sqrt{2}$

C-16. From (1, 4) you travel $5\sqrt{2}$ units by making 135° angle with positive x-axis (anticlockwise) and then 4 units by making 120° angle with positive x-axis (clockwise) to reach Q. Find co-ordinates of point Q.

(1) $\left(+6,\ 9-2\sqrt{3}\right)$ (2) $\left(-6,\ 9-2\sqrt{3}\right)$ (3) $\left(-6,\ 9+2\sqrt{3}\right)$ (4) $\left(+6,\ 9+2\sqrt{3}\right)$

C-17. A straight line is drawn through the point (2,3) and is inclined at an angle of 30º with the x-axis. Find the coordinates of two points on it at a distance 4 from P.

(1) $(2+2\sqrt{3}, 5)$ or $(2-2\sqrt{3}, 1)$ (2) $(2-2\sqrt{3}, 5)$ or $(2-2\sqrt{3}, 1)$

(3) $(2-2\sqrt{3}, 5)$ or $(2+2\sqrt{3}, 1)$ (4) $(2+2\sqrt{3}, 5)$ or $(2+2\sqrt{3}, 1)$

C-18. Which pair of points lie on the same side of 3x – 8y – 7 = 0

(1) (0, –1) and (0, 0) (2) (4, –3) and (0, 1)

(3) (– 3, – 4) and (1, 2) (4) (–1, –1) and (3, 7)

C-19. The set of values of 'b' for which the origin and the point (1, 1) lie on the same side of the straight line, $a^2x + aby + 1 = 0$ $\forall$ $a \in R$, $b > 0$ are :

(1) $b \in (2, 4)$ (2) $b \in (0, 2)$ (3) $b \in [0, 2]$ (4) $(2, \infty)$

C-20. The angle between the lines 2x + 3y = 5 and 3x – 2y = 7 is-

(1) 45º (2) 30º (3) 60º (4) 90º

C-21. Given points A (4,5), B (–1,–4), C (1,3), D (5,–3), then the ratio of the segment into which AB is divided by CD is

(1) $\frac{20}{13}$ (2) $\frac{13}{20}$ (3) $\frac{11}{20}$ (4) $\frac{13}{19}$

Section (D) : Centroid, Circumcenter Orthocenter, Incenter, Excenter

D-1. The line bx + ay = 3ab cuts the coordinate axes at A and B, then centroid of ΔOAB is -

(1) (b, a) (2) (a, b) (3) (a/3, b/3) (4) (3a, 3b)

D-2. Circumcentre of a triangle whose vertex are (0, 0), (4, 0) and (0, 6) is-

(1) $\left(\frac{4}{3},\ 2\right)$ (2) (0, 0) (3) (2, 3) (4) (4, 6)

D-3. The orthocentre of the triangle ABC is 'B' and the circumcentre is S (a, b). If A is the origin, then the co−ordinates of C are :

(1) (2a, 2b) (2) $\left(\frac{a}{2}, \frac{b}{2}\right)$ (3) $\left(\sqrt{a^2+b^2}\ , 0\right)$ (4) none

D-4. The incentre of the triangle formed by (0, 0), (5, 12), (16, 12) is

(1) (7, 9) (2) (9, 7) (3) (–9, 7) (4) (–7, 9)

D-5. If two vertices joininig the hypotenuse of a right angled triangle are (0, 0) and (3, 4), then the length of the median through the vertex having right angle is-

(1) 3 (2) 2 (3) 5/2 (4) 7/2

D-6. A variable straight line passes through a fixed point (a, b) intersecting the co−ordinates axes at A & B. If 'O' is the origin, then the locus of the centroid of the triangle OAB is :

(1) bx + ay – 3xy = 0 (2) bx + ay – 2xy = 0 (3) ax + by – 3xy = 0 (4) ax + by – 2xy = 0

Section (E) : Distance between parallel lines, Foot of the perpendicular image of a point and Area of parallelogram

E-1. The figure formed by the lines 2x + 5y + 4 = 0, 5x + 2y + 7 = 0, 2x + 5y + 3 = 0 and 5x + 2y + 6 = 0 is

(1) Square (2) Rectangle (3) Rhombus (4) None of these

E-2. Area of the parallelogram formed by the lines y = mx, y = mx + 1, y = nx and y = nx + 1 equals

(1) $\frac{|m+n|}{(m-n)^2}$ (2) $\frac{2}{|m+n|}$ (3) $\frac{1}{|m+n|}$ (4) $\frac{1}{|m-n|}$

E-3. The reflection of the point (4, –13) in the line 5x + y + 6 = 0 is

(1) (–1, –14) (2) (3, 4) (3) (1, 2) (4) (–4, 13)

E-4. The image of the point A (1, 2) by the line mirror y = x is the point B and the image of B by the line mirror y = 0 is the point (α, β), then :

(1) $\alpha = 1, \beta = -2$ (2) $\alpha = 0, \beta = 0$ (3) $\alpha = 2, \beta = -1$ (4) none of these

E-5. The foot of perpendicular drawn from point (1, 2) on the line L is (2, 3), then equation of line L is

(1) x + y – 3 = 0 (2) x + y – 5 = 0 (3) x + y + 5 = 0 (4) 2x + y – 5 = 0

E-6. A light beam eminating from the point A(3, 10) reflects from the straight line 2x + y − 6 = 0 and then passes through the point B(4, 3). The equation of the reflected beam is :

(1) 3x − y + 1 = 0 (2) x + 3y − 13 = 0 (3) 3x + y − 15 = 0 (4) x − 3y + 5 = 0

Section (F) : Angle bisectors, concurrent lines and family of lines

F-1. The equation of the bisector of the acute angle between the lines 3x – 4y + 7 = 0 and 12x + 5y – 2 = 0 is

(1) 11x – 3y + 9 = 0 (2) 3x + 11y – 13 = 0 (3) 3x + 11y – 3 = 0 (4) 11x – 3y + 2 = 0

F-2. The equations of bisectors of two lines L_1 & L_2 are 2x − 16y − 5 = 0 and 64x + 8y + 35 = 0. If the line L_1 passes through (− 11, 4), the equation of acute angle bisector of L_1 & L_2 is :

(1) 2x − 16y − 5 = 0 (2) 64x + 8y + 35 = 0 (3) data insufficient (4) none of these

F-3. The lines (p – q) x + (q – r) y + (r – p) = 0, (q – r) x + (r – p) y + (p – q) = 0
(r – p) x + (p – q) y + (q – r) = 0 are

(1) Parallel (2) perpendicular (3) Concurrent (4) None of these

F-4. The least positive value of t so that the lines x = t + a, y + 16 = 0 and y =ax are concurrent is

(1) 2 (2) 4 (3) 16 (4) 8

F-5. The solution of eqution of equations x + y = 10, 2x + y = 18, and 4x –3y = 26, will be

(1) Only one solution (2) No solution (3) Infinite solution (4) None fo these

F-6. The lines ax + by + c = 0, where 3a + 2b + 4c = 0, are concurrent at the point :

(1) $\left(\frac{1}{2}, \frac{3}{4}\right)$ (2) (1, 3) (3) (3, 1) (4) $\left(\frac{3}{4}, \frac{1}{2}\right)$

F-7. The equation of the line through the point of intersection of the lines y = 3 and x + y = 0 and parallel to the line 2x – y = 4 is -

(1) 2x – y + 9 = 0 (2) 2x – y – 9 = 0 (3) 2x – y + 1 = 0 (4) None of these

F-8. The fix point through which the line x(a + 2b) + y(a + 3b) = a + b always passes for all values of a and b, is-

(1) (2, 1) (2) (1, 2) (3) (2, –1) (4) (1, –2)

F-9. A straight line cuts intercepts from the coordinate axes sum of whose reciprocals is 1/p. It passses through a fixed point -
(1) (1/ p, p) (2) (p, 1/p) (3) (1/p, 1/p) (4) (p, p)

F-10. The line parallel to the x-axis and passing through the intersection of the lines ax + 2by + 3b = 0 and bx – 2ay –3a = 0, where (a, b) ≠ (0, 0) is
(1) Above the x-axis at a distance of 3/2 from it (2) Above the x-axis at a distance of 2/3 from it
(3) Below the x-axis at a distance of 3/2 from it (4) Below the x-axis at a distance of 2/3 from it

Section (G) : Pairs of lines and homogenization

G-1. The eqution $4x^2 - 24xy + 11y^2 = 0$ represents
(1) x+y = 0 & x– 11 y = 0 (2) x–y = 0 & x+ 11 y = 0
(3) x–y = 0 & x– 11 y = 0 (4) x+y = 0 & x+ 11 y = 0

G-2. If the slope of one line of the pair of lines represented by $ax^2 + 10xy + y^2 = 0$ is four times the slope of the other line, then 'a' equals to
(1) 1 (2) 2 (3) 4 (4) 16

G-3. The combined equation of the bisectors of the angle between the lines represented by $(x^2 + y^2)\sqrt{3} = 4xy$ is
(1) $y^2 - x^2 = 0$ (2) $xy = 0$ (3) $x^2 + y^2 = 2xy$ (4) $\frac{x^2 - y^2}{\sqrt{3}} = \frac{xy}{2}$

G-4. The eqution of the linies represented by the equation $ax^2 + (a + b)xy + by^2 + x + y = 0$ are
(1) ax + by + 1 = 0, x + y = 0 (2) ax + by – 1 = 0, x + y = 0
(3) ax + by + 1 = 0 (4) None of these

G-5. The angle between the lines $x^2 - xy - 6y^2 - 7x + 31y - 18 = 0$ is
(1) 45° (2) 60° (3) 90° (4) 30°

G-6. If the equation $2x^2 + k\,xy - 3y^2 - x - 4y - 1 = 0$ represents a pair of lines, then the value of 'k' can be:
(1) 1, – 5 (2) 3, 5 (3) −1, 3 (4) 2, 5

G-7. If the equation $2x^2 - 2xy - y^2 - 6x + 6y + c = 0$ represents a pair of lines, then 'c' is
(1) 2 (2) 3 (3) – 3 (4) 1

G-8. 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 :
(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{6}$

G-9. If distance between the pair of parallel lines $x^2 + 2xy + y^2 - 8ax - 8ay - 9a^2 = 0$ is $25\sqrt{2}$, then 'a/5' is equal to
(1) ± 4 (2) ± 2 (3) ± 3 (4) ± 1

Exercise-2

Marked Questions may have for Revision Questions.

PART - I : OBJECTIVE QUESTIONS

1. The equation of a straight line which passes through the point (– 4, 3) and is such that the portion of it between the axes is divided by the point in the ratio 5 : 3 internally, is.
(1) 9x – 20y + 96 = 0 (2) 2x – y + 11 = 0 (3) 2x + y + 5 = 0 (4) 3x – 2y + 7 = 0

2. Area of the quadrilateral formed by the lines $|x| + |y| = 2$ is :
(1) 8 (2) 6 (3) 4 (4) none

3. Two mutually perpendicular straight lines are drawn from the origin forming an isosceles triangle together with the straight line, $2x + y = a$. Then the area of the triangle is :
(1) $\frac{a^2}{2}$ (2) $\frac{a^2}{3}$ (3) $\frac{a^2}{5}$ (4) none

4. On the portion of the straight line $x + 2y = 4$ intercepted between the axes, a square is constructed on the side of the line away from the origin. Then the point of intersection of its diagonals has co−ordinates :
(1) (2, 3) (2) (3, 2) (3) (3, 3) (4) none

5. AB is a variable line sliding between the co-ordinate axes in such a way that A lies on X-axis and B lies on Y-axis. If P is a variable point on AB such that PA = b, PB = a and AB = a + b, then equation of locus of P is
(1) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (2) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (3) $x^2 + y^2 = a^2 + b^2$ (4) none of these

6. The nearest point on the line $3x + 4y - 1 = 0$ from the origin is
(1) $\left(\frac{7}{25}, \frac{4}{25}\right)$ (2) $\left(\frac{7}{25}, \frac{2}{25}\right)$ (3) $\left(\frac{3}{25}, \frac{4}{25}\right)$ (4) $\left(\frac{1}{25}, \frac{3}{25}\right)$

7. One side of a rectangle lies along the line $4x + 7y + 5 = 0$. Two of its vertices are (–3, 1) and (1, 1). Then the equations of other side is -
(1) $7x - 4y + 25 = 0$ (2) $4x + 7y = 11$ (3) $7x - 4y - 3 = 0$ (4) All of these

8. The equation of a straight line which passes through the point (2, 1) and makes an angle of $\pi/4$ with the straight line $2x + 3y + 4 = 0$ is
(1) $x + 5y + 3 = 0$ (2) $x - 5y + 1 = 0$ (3) $5x + y - 11 = 0$ (4) $5x - y + 1 = 0$

9. The area of parallelogram whose two sides are $y = x + 3$, $2x - y + 1 = 0$ and remaining two sides are passing through (0, 0) is
(1) 2 sq. unit (2) 3 sq. unit (3) $\frac{5}{2}$ sq. unit (4) $\frac{7}{2}$ sq. unit

10. The equations of the perpendicular bisectors of the sides AB and AC of a ΔABC are $x - y + 5 = 0$ and $x + 2y = 0$ respectively. If the point A is (1, –2), then the equation of the line BC is :
(1) $14x + 23y = 40$ (2) $14x - 23y = 40$ (3) $23x + 14y = 40$ (4) $23x - 14y = 40$

11. The point $(a^2, a + 1)$ is a point in the angle between the lines $3x - y + 1 = 0$ and $x + 2y - 5 = 0$ containing the origin if :
(1) $a \geq 1$ or $a \leq -3$ (2) $a \in (-3, 0) \cup (1/3, 1)$
(3) $a \in (0, 1)$ (4) none of these

12. The equations of two straight lines which are parallel to $x + 7y + 2 = 0$ and at unit distance from the point (1, – 1) are
(1) $x + 7y + 6 \pm 4\sqrt{2} = 0$ (2) $x + 7y + 6 \pm 5\sqrt{2} = 0$
(3) $2x + 7y + 6 \pm 5\sqrt{2} = 0$ (4) $x + y + 6 \pm 5\sqrt{2} = 0$

13. The points on the line $x + y = 4$ which lie at a unit distance from the line $4x + 3y = 10$, are
(1) (3, 1), (–7, 11) (2) (7, 11), (2, 2) (3) (7, –11), (–3, 7) (4) (1, 3), (–5, 9)

14. The line $x + 3y - 2 = 0$ bisects the angle between a pair of straight lines of which one has equation $x - 7y + 5 = 0$. The equation of the other line is :

(1) $3x + 3y - 1 = 0$ (2) $x - 3y + 2 = 0$ (3) $5x + 5y - 3 = 0$ (4) none

15. Through the point P(4, 1) a line is drawn to meet the line $3x - y = 0$ at Q where PQ = $\frac{11}{2\sqrt{2}}$. Determine the equation of line.
(1) $x + y = 5$, $x - 7y + 3 = 0$ (2) $x - y = 5$, $x - 7y + 3 = 0$
(3) $x + y = 5$, $x + 7y + 3 = 0$ (4) $x - y = 5$, $x + 7y + 3 = 0$

16. A triangle ABC with vertices A (–1, 0), B (–2, 3/4) & C (–3, – 7/6) has its orthocentre H. Then the orthocentre of triangle BCH will be :
(1) (– 3, – 2) (2) (1, 3) (3) (– 1, 2) (4) none of these

17. In a triangle ABC, co-ordinates of A are (1, 2) and the equations to the medians through B and C are $x + y = 5$ and $x = 4$ respectively. Then the co-ordinates of B and C will be
(1) (–2, 7), (4, 3) (2) (7, – 2), (4, 3) (3) (2, 7), (– 4, 3) (4) (2, –7), (3, – 4)

18. Equation of a straight line passing through the point (4, 5) and equally inclined to the lines $3x = 4y + 7$ and $5y = 12x + 6$ is
(1) $9x - 7y = 1$ (2) $9x + 7y = 71$ (3) $7x - y = 73$ (4) $7x - 9y + 17 = 0$

19. Equation of a straight line which passes through the point of intersection of the straight lines $x + y - 5 = 0$ and $x - y + 3 = 0$ and perpendicular to the straight line intersecting x-axis at the point (–2, 0) and the y-axis at the point (0, –3), is
(1) $2x - y + 10 = 0$ (2) $x - 3y + 10 = 0$ (3) $2x - 3y + 10 = 0$ (4) $2x - 3y + 12 = 0$

20. If $a^2 + 9b^2 - 4c^2 = 6ab$, then the family of lines $ax + by + c = 0$ are concurrent at :
(1) $\left(\frac{1}{2},\frac{3}{2}\right)\left(-\frac{1}{3}, \frac{-3}{2}\right)$ (2) $\left(-\frac{1}{2},-\frac{3}{2}\right)\left(-\frac{1}{5}, \frac{-3}{2}\right)$ (3) $\left(-\frac{1}{7},-\frac{3}{2}\right)\left(-\frac{1}{5}, \frac{-3}{2}\right)$ (4) $\left(-\frac{1}{2},\frac{3}{2}\right)\left(\frac{1}{2}, -\frac{3}{2}\right)$

21. The value of k so that the equation $12x^2 - 10xy + 2y^2 + 11x - 5y + k = 0$ may represent a pair of straight lines is
(1) 2 (2) 0 (3) 1 (4) – 5

22. 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
(1) 4 (2) $\frac{4}{\sqrt{3}}$ (3) 2 (4) $2\sqrt{3}$

23. Equation of the line pair through the origin and perpendicular to the line pair $xy - 3y^2 + y - 2x + 10 = 0$ is :
(1) $xy - 3y^2 = 0$ (2) $xy + 3x^2 = 0$ (3) $xy + 3y^2 = 0$ (4) $x^2 - y^2 = 0$

24. If the straight lines joining the origin and the points of intersection of the curve $5x^2 + 12xy - 6y^2 + 4x - 2y + 3 = 0$ and $x + ky - 1 = 0$ are equally inclined to the x-axis, then the value of k is equal to :
(1) 1 (2) −1 (3) 2 (4) 3

PART - II : MISCELLANEOUS QUESTIONS

Section (A) : ASSERTION/REASONING

DIRECTIONS :

Each question has 4 choices (1), (2), (3) and (4) out of which ONLY ONE is correct.
(1) Both the statements are true.
(2) Statement-I is true, but Statement-II is false.
(3) Statement-I is false, but Statement-II is true.
(4) Both the statements are false.

A-1. **Statement-1 :** Two of the straight lines represented by the equation $ax^3 + bx^2y + cxy^2 + dy^3 = 0$ will be at right angled if $a^2 + ac + bd + d^2 = 0$

Statement-2 : If roots of equation $px^3 + qx^2 + rx + s = 0$ are α, β and γ, then $\alpha\beta\gamma = -s/p$.

A-2. **Statement-1 :** The diagonals of the quadrilateral whose sides are $3x + 2y + 1 = 0$, $3x + 2y + 2 = 0$, $2x + 3y + 1 = 0$ and $2x + 3y + 2 = 0$ include an angle $\pi/2$

Statement-2 : Diagonals of a parallelogram bisect each other.

A-3. **Statement-1 :** Each point on the line $y - x + 12 = 0$ is at same distance from the lines $3x + 4y - 12 = 0$ and $4x + 3y - 12 = 0$.

Statement-2 : locus of point which is at equal distance from the two given intersecting lines is the angle bisectors of the two lines.

A-4. **Statement-1 :** A straight line L with negative slope passes through the point (8, 2) and cuts the positive coordinate axes at points P and Q. The absolute minimum value of OP + OQ, as L varies, where O is the origin is 18.

Statement-2 : A.M. ≥ G.M.

Section (B) : MATCH THE COLUMN

B-1.

	Column-I		Column-II
(A)	Two vertices of a triangle are (5, –1) and (–2, 3). If orthocentre is the origin, then coordinates of the third vertex are	(p)	(–4, –7)
(B)	A point on the line $x + y = 4$ which lies at a unit distance from the line $4x + 3y = 10$, is	(q)	(–7, 11)
(C)	Orthocentre of the triangle made by the lines $x + y - 1 = 0$, $x - y + 3 = 0$, $2x + y = 7$ is :	(r)	(1, –2)
(D)	If a, b, c are in A.P., then liines $ax + by = c$ are concurrent at :	(s)	(–1, 2)
		(t)	(4, –7)

B-2. Consider the lines given by

$L_1 : x + 3y - 5 = 0$

$L_2 : 3x - ky - 1 = 0$

$L_3 : 5x + 2y - 12 = 0$

Match the Statements/Expressions in **Column I** with the Statements / Expressions in **Column II** and indicate your answer by darkening the appropriate bubbles in the 4 × 4 matrix given in the ORS.

	Column I		Column II
(A)	L_1, L_2, L_3 are concurrent, if	(p)	$k = -9$
(B)	One of L_1, L_2, L_3 is parallel to at least one of the other two, if	(q)	$k = -\frac{6}{5}$
(C)	L_1, L_2, L_3 form a triangle, if	(r)	$k = \frac{5}{6}$
(D)	L_1, L_2, L_3 do not form a triangle, if	(s)	$k = 5$

Section (C) : ONE OR MORE THAN ONE OPTIONS CORRECT

C-1. If A(a, a), B(–a, –a) are two vertices of an equilateral triangle, then its third vertex is :

(1) $\left(\frac{a\sqrt{3}}{2}, \frac{a\sqrt{3}}{2}\right)$ (2) $\left(-a\sqrt{3}, a\sqrt{3}\right)$ (3) $\left(a\sqrt{3}, -a\sqrt{3}\right)$ (4) $\left(-a\sqrt{3}, -a\sqrt{3}\right)$

C-2. Determine whether the triangle formed by the lines $x - 7y + 12 = 0$, $7x + y - 16 = 0$ and $3x + 4y - 4 = 0$ is

(1) equilateral (2) right-angled (3) isosceles (4) None

C-3. The sides of a triangle are the straight lines $x + y = 1$; $7y = x$ and $\sqrt{3}y + x = 0$. Then which of the following is an interior point of the triangle ?

(1) circumcentre (2) centroid (3) incentre (4) orthocentre

C-4. For the straight lines $4x + 3y - 7 = 0$ and $24x + 7y - 31 = 0$, the equation of

(1) bisector of the obtuse angle between them is $x - 2y + 1 = 0$

(2) bisector of the acute angle between them is $2x + y - 3 = 0$

(3) bisector of the angle containing origin is $x - 2y + 1 = 0$

(4) bisector of the angle containing the point (1, –2) is $x - 2y + 1 = 0$

Exercise-3

Marked Questions may have for Revision Questions.

*** Marked Questions may have more than one correct option.**

PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

1. Three straight lines $2x + 11y - 5 = 0$, $4x - 3y - 2 = 0$ and $24x + 7y - 20 = 0$

[AIEEE - 2002 (3, –1), 225]

(1) form a triangle

(2) are only concurrent

(3) are concurrent with one line bisecting the angle between the other two

(4) none of these

2. A straight line through the point (2,2) intersects the lines $\sqrt{3}x + y = 0$ and $\sqrt{3}x - y = 0$ at the points A and B.The equation to the line AB so that the triangle OAB is equilateral is

[AIEEE - 2002 (3, –1), 225]

(1) $x - 2 = 0$ (2) $y - 2 = 0$ (3) $x + y - 4 = 0$ (4) none of these

3. If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then the value of 'c' is : **[AIEEE - 2003 (3, –1), 225]**

(1) $\frac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$ (2) $a_1^2 - a_2^2 + b_1^2 - b_2^2$

(3) $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$ (4) $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

4. Locus of centroid of the triangle whose vertices are (a cos t, a sin t), (b sin t, – b cos t) and (1, 0), where t is a parameter is : **[AIEEE - 2003 (3, –1), 225]**

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

(3) $(3x + 1)^2 + (3y)^2 = a^2 + b^2$ (4) $(3x + 1)^2 + (3y)^2 = a^2 - b^2$

5. Let A(2,–3) and B(–2,1) be vertices of a triangle ABC. If the centroid of this triangle moves on the line $2x + 3y = 1$, then the locus of the vertex C is the line : **[AIEEE - 2004 (3, –1), 225]**

(1) $2x + 3y = 9$ (2) $2x - 3y = 7$ (3) $3x + 2y = 5$ (4) $3x - 2y = 3$

6. 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 : **[AIEEE - 2004 (3, –1), 225]**

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

(3) $\frac{x}{2}+\frac{y}{3}=1$ and $\frac{x}{-2}+\frac{y}{1}=1$ (4) $\frac{x}{2}-\frac{y}{3}=1$ and $\frac{x}{-2}+\frac{y}{1}=1$

7. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals :
[AIEEE - 2004 (3, –1), 225]

(1) 1 (2) –1 (3) 3 (4) –3

8. The line parallel to the x–axis and passing through the intersection of the lines $ax + 2by + 3b = 0$ and $bx - 2ay - 3a = 0$, where $(a,b) \neq (0,0)$ is : **[AIEEE - 2005 (3, –1), 225]**

(1) above the x–axis at a distance of (2/3) from it
(2) above the x–axis at a distance of (3/2) from it
(3) below the x–axis at a distance of (2/3) from it
(4) below the x–axis at a distance of (3/2) from it

9. If non–zero numbers a,b,c are in HP, then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through a fixed point. That point is : **[AIEEE - 2005 (3, –1), 225]**

(1) $\left(1,\ -\frac{1}{2}\right)$ (2) (1, – 2) (3) (–1, – 2) (4) (–1, 2)

10. If a vertex of a triangle is (1,1) and the mid–points of two sides through this vertex are (–1,2) and (3,2), then the centroid of the triangle is : **[AIEEE - 2005 (3, –1), 225]**

(1) $\left(\frac{1}{3},\frac{7}{3}\right)$ (2) $\left(1,\ \frac{7}{3}\right)$ (3) $\left(-\frac{1}{3},\ \frac{7}{3}\right)$ (4) $\left(-1\ ,\ \frac{7}{3}\right)$

11. A straight line through the point A (3, 4) is such that its intercept between the axes is bisected at A. Its equation is : **[AIEEE - 2006 (3, –1), 120]**

(1) $3x - 4y + 7 = 0$ (2) $4x + 3y = 24$ (3) $3x + 4y = 25$ (4) $x + y = 7$

12. If (a, a^2) falls inside the angle made by the lines $y = \frac{x}{2}$, $x > 0$ and $y = 3x$, $x > 0$, then 'a' belongs to :
[AIEEE - 2006 (3, –1), 120]

(1) $(3, \infty)$ (2) $\left(\frac{1}{2},\ 3\right)$ (3) $\left(-3,\ -\frac{1}{2}\right)$ (4) $\left(0,\ \frac{1}{2}\right)$

13. Let A(h, k), B(1, 1) and C(2, 1) be the vertices of a right angled triangle with AC as its hypotenuse. If the area of triangle is 1, then the set of values which 'k' can take is given by **[AIEEE - 2007 (3, –1), 120]**

(1) {1, 3} (2) {0, 2} (3) {–1, 3} (4) {–3, – 2}

14. Let P = (–1, 0) Q = (0, 0) and R = $(3,\ 3\sqrt{3})$ be three points. The equation of the bisector of the ∠PQR is **[AIEEE - 2007 (3, –1), 120]**

(1) $\sqrt{3}x + y = 0$ (2) $x + \frac{\sqrt{3}}{2}y = 0$ (3) $\frac{\sqrt{3}}{2}x + y = 0$ (4) $x + \sqrt{3}y = 0$

15. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is **[AIEEE - 2007 (3, –1), 120]**

(1) $-\frac{1}{2}$ (2) – 2 (3) ± 1 (4) 2

Straight Line

16. The perpendicular bisector of the line segment joining P(1, 4) and Q(k, 3) has y-intercept – 4. Then a possible value of k is **[AIEEE - 2008 (3, –1), 105]**
(1) – 4 (2) 1 (3) 2 (4) – 2

17. The lines $p(p^2 + 1)x - y + q = 0$ and $(p^2 + 1)^2 x + (p^2 + 1)y + 2q = 0$ are perpendicular to a common line in 2-D geometry for: **[AIEEE - 2009(4, –1),144]**
(1) exactly one value of p (2) exactly two values of p
(3) more than two values of p (4) no value of p

18. Three distinct points A, B and C are given in the 2-dimensional coordinate plane such that the ratio of the distance of any point from the point (1, 0) to the distance from the point (–1, 0) is equal to $\frac{1}{3}$. Then the circumcentre of the triangle ABC is at the point : **[AIEEE - 2009 (4, –1), 144]**
(1) $\left(\frac{5}{4}, 0\right)$ (2) $\left(\frac{5}{2}, 0\right)$ (3) $\left(\frac{5}{3}, 0\right)$ (4) 0, 0

19. The line L given by $\frac{x}{5} + \frac{y}{b} = 1$ passes through the point (13, 32). The line K is parallel to L and has the equation $\frac{x}{c} + \frac{y}{3} = 1$. Then the distance between L and K is **[AIEEE - 2010 (8, –2), 144]**
(1) $\sqrt{17}$ (2) $\frac{17}{\sqrt{15}}$ (3) $\frac{23}{\sqrt{17}}$ (4) $\frac{23}{\sqrt{15}}$

20. The line $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R. **[AIEEE - 2011, I(4, –1), 120]**

Statement-1 : The ratio PR : RQ equals $2\sqrt{2} : \sqrt{5}$
Statement-2 : In any triangle, bisector of an angle divides the triangle into two similar triangles.
(1) Statement-1 is true, Statement-2 is true ; Statement-2 is correct explanation for Statement-1
(2) Statement-1 is true, Statement-2 is true ; Statement-2 is **not** a correct explanation for Statement-1
(3) Statement-1 is true, Statement-2 is false
(4) Statement-1 is false, Statement-2 is true

21. The lines x + y = | a | and ax – y = 1 intersect each other in the first quadrant. Then the set of all possible values of a is the interval : **[AIEEE - 2011, II(4, –1), 120]**
(1) (0, ∞) (2) [1, ∞) (3) (–1, ∞) (4) (–1, 1]

22. If A(2, –3) and B(–2, 1) are two vertices of a triangle and third vertex moves on the line 2x + 3y = 9 , then the locus of the centroid of the triangle is : **[AIEEE - 2011, II(4, –1), 120]**
(1) x – y = 1 (2) 2x + 3y = 1 (3) 2x + 3y = 3 (4) 2x – 3y = 1

23. If the line 2x + y = k passes through the point which divides the line segment joining the points (1, 1) and (2, 4) in the ratio 3 : 2, then k equals : **[AIEEE-2012, (4, –1)/120]**
(1) $\frac{29}{5}$ (2) 5 (3) 6 (4) $\frac{11}{5}$

24. A line is drawn through the point (1, 2) to meet the coordinate axes at P and Q such that it forms a triangle OPQ, where O is the origin. if the area of the triangle OPQ is least, then the slope of the line PQ is : **[AIEEE-2012, (4, –1)/120]**
(1) $-\frac{1}{4}$ (2) – 4 (3) – 2 (4) $-\frac{1}{2}$

25. A ray of light along $x + \sqrt{3}y = \sqrt{3}$ gets reflected upon reaching x-axis, the equation of the reflected ray is **[AIEEE - 2013, (4, – 1) 120]**
(1) $y = x + \sqrt{3}$ (2) $\sqrt{3}y = x - \sqrt{3}$ (3) $y = \sqrt{3}x - \sqrt{3}$ (4) $\sqrt{3}y = x - 1$

26. The x-coordinate of the incentre of the triangle that has the coordinates of mid points of its sides as (0, 1) (1, 1) and (1, 0) is : **[AIEEE - 2013, (4, – 1) 120]**

(1) $2 + \sqrt{2}$ (2) $2 - \sqrt{2}$ (3) $1 + \sqrt{2}$ (4) $1 - \sqrt{2}$

27. Let PS be the median of the triangle with vertices P(2, 2), Q (6, – 1), and R (7, 3). The equation of the line passing through (1, – 1) and parallel to PS is : **[JEE(Main) 2014, (4, – 1), 120]**

(1) $4x + 7y + 3 = 0$ (2) $2x - 9y - 11 = 0$ (3) $4x - 7y - 11 = 0$ (4) $2x + 9y + 7 = 0$

28. Let a, b, c and d be non-zero numbers. If the point of intersection of the lines $4ax + 2ay + c = 0$ and $5bx + 2by + d = 0$ lies in the fourth quadrant and is equidistant from the two axes then : **[JEE(Main) 2014, (4, – 1), 120]**

(1) $3bc - 2ad = 0$ (2) $3bc + 2ad = 0$ (3) $2bc - 3ad = 0$ (4) $2bc + 3ad = 0$

29. The number of points, having both co-ordinates as integers, that lie in the interior of the triangle with vertices (0, 0), (0, 41) and (41, 0) is **[JEE(Main) 2015, (4, – 1), 120]**

(1) 901 (2) 861 (3) 820 (4) 780

30. Two sides of a rhombus are along the lines, $x - y + 1 = 0$ and $7x - y - 5 = 0$. if its diagonals intersect at (–1, –2), then which one of the following is a vertex of this rhombus ? **[JEE(Main) 2016, (4, – 1), 120]**

(1) (–3, –8) (2) $\left(\frac{1}{3}, -\frac{8}{3}\right)$ (3) $\left(-\frac{10}{3}, -\frac{7}{3}\right)$ (4) (–3, –9)

31. Let k be an integer such that the triangle with vertices (k, –3k), (5, k) and (–k, 2) has area 28 sq. units. Then the orthocentre of this triangle is at the point : **[JEE(Main) 2017, (4, – 1), 120]**

(1) $\left(2, -\frac{1}{2}\right)$ (2) $\left(1, \frac{3}{4}\right)$ (3) $\left(1, -\frac{3}{4}\right)$ (4) $\left(2, \frac{1}{2}\right)$

32. A straight line through a fixed point (2,3) intersects the coordinate axes at distinct points P and Q. If O is the origin and the rectangle OPRQ is completed, then the locus of R is **[JEE(Main) 2018, (4, – 1), 120]**

(1) $3x + 2y = xy$ (2) $3x + 2y = 6xy$ (3) $3x + 2y = 6$ (4) $2x + 3y = xy$

PART - II : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. The area bounded by the curves $y = | x | - 1$ and $y = - | x | + 1$ is **[IIT-JEE - 2002, Scr, (3,– 1), 90]**

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

2. Let $0 < \alpha < \frac{\pi}{2}$ be fixed angle. If P = (cosθ, sin θ) and Q = (cos(α – θ), sin (α – θ)), then Q is obtained from P by **[IIT-JEE - 2002,Scr, (3,– 1), 90]**

(A) clockwise rotation around origin through an angle α

(B) anticlockwise rotation around origin through an angle α

(C) reflection in the line through origin with slope tan α

(D) reflection in the line through origin with slope tan (α/2)

3. 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 **[IIT-JEE - 2002,Scr, (3,– 1), 90]**

(A) $\frac{\sqrt{3}}{2}x + y = 0$ (B) $x + \sqrt{3}y = 0$ (C) $\sqrt{3}x + y = 0$ (D) $x + \frac{\sqrt{3}}{2}y = 0$

4. A straight line through the origin O meets the parallel lines $4x + 2y = 9$ and $2x + y + 6 = 0$ at points P and Q respectively. Then the point O divides the segement PQ in the ratio **[IIT-JEE - 2002,Scr, (3,– 1), 90]**

(A) 1 : 2 (B) 3 : 4 (C) 2 : 1 (D) 4 : 3

5. A straight line L through the origin meets the lines x + y = 1 and x + y = 3 at P and Q respectively. Through P and Q two straight lines L_1 and L_2 are drawn parallel to 2x – y = 5 and 3x + y = 5 respectively. Lines L_1 and L_2 intersect at R. Show that the locus of R, as L varies, is a straight line.

[IIT-JEE - 2002,Main, (5, 0), 60]

6. A straight line L with negative slope passes through the point (8, 2) and cuts the positive coordinate axes at points P and Q. Find the absolute minimum value of OP + OQ, as L varies, where O is the origin.

[IIT-JEE - 2002,Main, (5, 0), 60]

7. The number of integral points (integral point means both the coordinates should be integer) exactlyin the interior of the triangle with vertices (0, 0), (0, 21) and (21, 0), is **[IIT-JEE - 2003, Scr, (3,– 1), 84]**

(A) 133 (B) 190 (C) 233 (D) 105

8. Orthocentre of triangle with vertices (0, 0), (3, 4) and (4, 0) is **[IIT-JEE - 2003,Scr, (3,– 1), 84]**

(A) $\left(3, \frac{5}{4}\right)$ (B) (3, 12) (C) $\left(3, \frac{3}{4}\right)$ (D) (3, 9)

9. The centre of circle inscribed in a square formed by lines $x^2 - 8x + 12 = 0$ and $y^2 - 14y + 45 = 0$ is

[IIT-JEE - 2003,Scr, (3,– 1), 84]

(A) (4, 7) (B) (7, 4) (C) (9, 4) (D) (4, 9)

10. Area of the triangle formed by the line x + y = 3 and angle bisectors of the pair of straight lines $x^2 - y^2 + 2y = 1$ is **[IIT-JEE - 2004, Scr, (3,– 1), 84]**

(A) 2 sq units (B) 4 sq. units (C) 6 sq. units (D) 8 sq. units

11. Let O(0, 0), P(3, 4), Q(6, 0) be the vertices of the triangle OPQ. The point R inside the triangle OPQ is such that the triangles OPR, PQR, OQR are of equal area. The co-ordinates of R are

[IIT-JEE - 2007, P-II, (3, – 1), 81]

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

12. Lines L_1 : y – x = 0 and L_2 : 2x + y = 0 intersect the line L_3 : y + 2 = 0 at P and Q, respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R. **[IIT-JEE - 2007, P-II, (3, – 1), 81]**

STATEMENT - 1 : The ratio PR : RQ equals $2\sqrt{2} : \sqrt{5}$.

because

STATEMENT - 2 : In any triangle, bisector of an angle divides the triangle into two similar triangles.

(A) Statement - 1 is True, Statement - 2 is True; Statement - 2 **is** a correct explanation for Statement - 1

(B) Statement - 1 is True, Statement - 2 is True; Statement - 2 is **NOT** a correct explanation for Statement - 1

(C) Statement - 1 is True, Statement - 2 is False

(D) Statement - 1 is False, Statement - 2 is True

13. A straight line **L** through the point (3, –2) is inclined at an angle 60º to the line $\sqrt{3}x + y = 1$. If **L** also intersects the x-axis, then the equation of **L** is **[IIT-JEE - 2011, Paper-1, (3, –1), 80]**

(A) $y + \sqrt{3}x + 2 - 3\sqrt{3} = 0$ (B) $y - \sqrt{3}x + 2 + 3\sqrt{3} = 0$

(C) $\sqrt{3}y - x + 3 + 2\sqrt{3} = 0$ (D) $\sqrt{3}y + x - 3 + 2\sqrt{3} = 0$

14. For $a > b > c > 0$, the distance between (1, 1) and the point of intersection of the lines $ax + by + c = 0$ and $bx + ay + c = 0$ is less than $2\sqrt{2}$. Then **[JEE (Advanced) 2013, Paper-1, (2, 0)/60]**

(A) $a + b - c > 0$ (B) $a - b + c < 0$ (C) $a - b + c > 0$ (D) $a + b - c < 0$

Answers

EXERCISE # 1

Section (A)

A-1.	(2)	**A-2.**	(3)	**A-3.**	(3)	**A-4**	(4)	**A-5.**	(2)	**A-6.**	(1)	**A-7.**	(2)
A-8.	(1)	**A-9.**	(2)	**A-10.**	(1)	**A-11.**	(1)	**A-12.**	(3)				

Section (B)

B-1.	(1)	**B-2.**	(1)	**B-3.**	(1)	**B-4.**	(2)	**B-5.**	(2)	**B-6.**	(4)	**B-7.**	(3)
B-8.	(3)	**B-9.**	(2)	**B-10.**	(2)								

Section (C)

C-1.	(2)	**C-2.**	(2)	**C-3.**	(2)	**C-4.**	(2)	**C-5.**	(3)	**C-6.**	(2)	**C-7.**	(3)
C-8.	(2)	**C-9.**	(2)	**C-10.**	(1)	**C-11.**	(1)	**C-12.**	(2)	**C-13.**	(1)	**C-14.**	(2)
C-15.	(2)	**C-16.**	(2)	**C-17.**	(1)	**C-18.**	(4)	**C-19.**	(2)	**C-20.**	(4)	**C-21.**	(2)

Section (D)

D-1.	(2)	**D-2.**	(3)	**D-3.**	(1)	**D-4.**	(1)	**D-5.**	(3)	**D-6.**	(1)

Section (E)

E-1.	(3)	**E-2.**	(4)	**E-3.**	(1)	**E-4.**	(3)	**E-5.**	(2)	**E-6.**	(2)

Section (F)

F-1.	(1)	**F-2.**	(1)	**F-3.**	(3)	**F-4.**	(4)	**F-5.**	(1)	**F-6.**	(4)	**F-7.**	(1)
F-8.	(3)	**F-9.**	(4)	**F-10.**	(3)								

Section (G)

G-1.	(3)	**G-2.**	(4)	**G-3.**	(1)	**G-4.**	(1)	**G-5.**	(1)	**G-6.**	(1)	**G-7.**	(2)
G-8.	(1)	**G-9.**	(4)										

EXERCISE # 2

PART - I

1.	(1)	**2.**	(1)	**3.**	(3)	**4.**	(3)	**5.**	(1)	**6.**	(3)	**7.**	(4)
8.	(3)	**9.**	(2)	**10.**	(1)	**11.**	(2)	**12.**	(2)	**13.**	(1)	**14.**	(3)
15.	(1)	**16.**	(4)	**17.**	(2)	**18.**	(1)	**19.**	(3)	**20.**	(4)	**21.**	(1)
22.	(3)	**23.**	(2)	**24.**	(2)								

PART - II

Section (A)

A-1.	(1)	**A-2.**	(1)	**A-3.**	(3)	**A-4.**	(1)

Section (B)

B-1. (A) → p ; (B) → q ; (C) → s ; (D) → s   **B-2.** (A) → (s), (B) → (p, q), (C) → (r), (D) → (p, q, s)

Section (C)

C-1.	(2, 3)	**C-2.**	(2, 3)	**C-3.**	(2, 3)	**C-4.**	(1, 2, 3, 4)

EXERCISE # 3

PART - I

1.	(3)	**2.**	(2)	**3.**	(1)	**4.**	(2)	**5.**	(1)	**6.**	(4)	**7.**	(4)
8.	(4)	**9.**	(2)	**10.**	(2)	**11.**	(2)	**12.**	(2)	**13.**	(3)	**14.**	(1)
15.	(3)	**16.**	(1)	**17.**	(1)	**18.**	(1)	**19.**	(3)	**20.**	(3)	**21.**	(2)
22.	(2)	**23.**	(3)	**24.**	(3)	**25.**	(2)	**26.**	(2)	**27.**	(4)	**28.**	(1)
29.	(4)	**30.**	(2)	**31.**	(4)	**32.**	(1)						

PART - II

1.	(B)	**2.**	(D)	**3.**	(C)	**4.**	(B)	**5.**	$x - 3y + 5 = 0$			**6.**	18
7.	(B)	**8.**	(C)	**9.**	(A)	**10.**	(A)	**11.**	(C)	**12.**	(C)	**13.**	(B)
14.	(A) or (C) or Bonus												