STRAIGHT LINES

SELECT THE CORRECT ALTERNATIVE (ONLY ONE CORRECT ANSWER)

1. If (3, –4) and (–6, 5) are the extremities of a diagonal of a parallelogram and (2, 1) is its third vertex, then its fourth vertex is -
(A) (–1, 0) (B) (–1, 1) (C) (0, –1) (D) (–5, 0)

2. The ratio in which the line joining the points (3, –4) and (–5, 6) is divided by x-axis -
(A) 2 : 3 (B) 6 : 4 (C) 3 : 2 (D) none of these

3. The circumcentre of the triangle with vertices (0, 0), (3, 0) and (0, 4) is -
(A) (1, 1) (B) (2, 3/2) (C) (3/2, 2) (D) none of these

4. The mid points of the sides of a triangle are (5, 0), (5, 12) and (0, 12), then orthocentre of this triangle is -
(A) (0, 0) (B) (0, 24) (C) (10, 0) (D) $\left(\frac{13}{3}, 8\right)$

5. Area of a triangle whose vertices are (a cos θ, b sinθ), (–a sin θ, b cos θ) and (–a cos θ, – b sin θ) is -
(A) a b sin θ cos θ (B) a cos θ sin θ (C) $\frac{1}{2}$ ab (D) ab

6. The point A divides the join of the points (–5,1) and (3,5) in the ratio k : 1 and coordinates of points B and C are (1,5) and (7,–2) respectively. If the area of ΔABC be 2 units, then k equals -
(A) 7,9 (B) 6,7 (C) 7,31/9 (D) 9,31/9

7. If A(cos α, sinα), B (sinα, – cosα), C (1,2) are the vertices of a ΔABC, then as α varies, the locus of its centroid is -
(A) $x^2 + y^2 - 2x - 4y + 3 = 0$ (B) $x^2 + y^2 - 2x - 4y + 1 = 0$
(C) $3(x^2 + y^2) - 2x - 4y + 1 = 0$ (D) none of these

8. The points with the co-ordinates (2a, 3a), (3b, 2b) & (c, c) are collinear-
(A) for no value of a, b, c (B) for all values of a, b, c
(C) if a, $\frac{c}{5}$, b are in H.P. (D) if a, $\frac{2}{5}$ c, b are in H.P.

9. A stick of length 10 units rests against the floor and a wall of a room. If the stick begins to slide on the floor then the locus of its middle point is -
(A) $x^2 + y^2 = 2.5$ (B) $x^2 + y^2 = 25$ (C) $x^2 + y^2 = 100$ (D) none

10. The equation of the line cutting an intercept of 3 units on negative y-axis and inclined at an angle $\tan^{-1}\frac{3}{5}$ to the x-axis is -
(A) $5y - 3x + 15 = 0$ (B) $5y - 3x = 15$ (C) $3y - 5x + 15 = 0$ (D) none of these

11. The equation of a straight line which passes through the point (–3, 5) such that the portion of it between the axes is divided by the point in the ratio 5 : 3, internally (reckoning from x-axis) will be -
(A) $x + y - 2 = 0$ (B) $2x + y + 1 = 0$ (C) $x + 2y - 7 = 0$ (D) $x - y + 8 = 0$

12. The points $\left(0, \frac{8}{3}\right)$, (1, 3) and (82, 30) are vertices of-
(A) an obtuse angled triangle (B) an acute angled triangle
(C) a right angled triangle (D) an isosceles triangle

13. The straight lines $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is-
(A) isosceles (B) equilateral (C) right angled (D) none of these

14. The co-ordinates of the vertices P, Q, R & S of square PQRS inscribed in the triangle ABC with vertices A ≡ (0, 0), B (3, 0) & C ≡ (2, 1) given that two of its vertices P, Q are on the side AB are respectively :
(A) $\left(\frac{1}{4}, 0\right), \left(\frac{3}{8}, 0\right), \left(\frac{3}{8}, \frac{1}{8}\right)$ & $\left(\frac{1}{4}, \frac{1}{8}\right)$ (B) $\left(\frac{1}{2}, 0\right), \left(\frac{3}{4}, 0\right), \left(\frac{3}{4}, \frac{1}{4}\right)$ & $\left(\frac{1}{2}, \frac{1}{4}\right)$
(C) (1, 0), $\left(\frac{3}{2}, 0\right), \left(\frac{3}{2}, \frac{1}{2}\right)$ & $\left(1, \frac{1}{2}\right)$ (D) $\left(\frac{3}{2}, 0\right), \left(\frac{9}{4}, 0\right), \left(\frac{9}{4}, \frac{3}{4}\right)$ & $\left(\frac{3}{2}, \frac{3}{4}\right)$

15. The equation of perpendicular bisector of the line segment joining the points (1, 2) and (–2, 0) is -

(A) $5x + 2y = 1$ (B) $4x + 6y = 1$ (C) $6x + 4y = 1$ (D) none of these

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

(A) one (B) two (C) three (D) four

17. Points A & B are in the first quadrant ; point 'O' is the origin. If the slope of OA is 1, slope of OB is 7 and OA = OB, then the slope of AB is -

(A) $-1/5$ (B) $-1/4$ (C) $-1/3$ (D) $-1/2$

18. A line is perpendicular to $3x + y = 3$ and passes through a point (2, 2). Its y intercept is -

(A) $2/3$ (B) $1/3$ (C) 1 (D) $4/3$

19. The equation of the line passing through the point (c, d) and parallel to the line $ax + by + c = 0$ 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

20. 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 one of the lines

(C) point lies on the different sides of the line (D) point lies between the lines

21. If origin and (3, 2) are contained in the same angle of the lines $2x + y - a = 0$, $x - 3y + a = 0$, then 'a' must lie in the interval -

(A) $(-\infty, 0) \cup (8, \infty)$ (B) $(-\infty, 0) \cup (3, \infty)$ (C) (0, 3) (D) (3, 8)

22. The line $3x + 2y = 6$ will divide the quadrilateral formed by the lines $x + y = 5$, $y - 2x = 8$, $3y + 2x = 0$ & $4y - x = 0$ in -

(A) two quadrilaterals (B) one pentagon and one triangle

(C) two triangles (D) one triangle and one quadrilateral

23. If the point (a, 2) lies between the lines $x - y - 1 = 0$ and $2(x - y) - 5 = 0$, then the set of values of a is -

(A) $(-\infty, 3) \cup (9/2, \infty)$ (B) $(3, 9/2)$ (C) $(-\infty, 3)$ (D) $(9/2, \infty)$

24. $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are three non-collinear points in cartesian plane. Number of parallelograms that can be drawn with these three points as vertices is -

(A) one (B) two (C) three (D) four

25. If P = (1,0) ; Q = (–1,0) & R = (2,0) are three given points, then the locus of the points S satisfying the relation, $SQ^2 + SR^2 = 2\,SP^2$ is -

(A) A straight line parallel to x-axis (B) A circle passing through the origin

(C) A circle with the centre at the origin (D) A straight line parallel to y-axis

26. The area of triangle formed by the lines $x + y - 3 = 0$, $x - 3y + 9 = 0$ and $3x - 2y + 1 = 0$ is -

(A) $\frac{16}{7}$ sq. units (B) $\frac{10}{7}$ sq. units (C) 4 sq. units (D) 9 sq. units

27. The co-ordinates of foot of the perpendicular drawn on line $3x - 4y - 5 = 0$ from the point (0, 5) is -

(A) (1, 3) (B) (2, 3) (C) (3, 2) (D) (3, 1)

28. 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

29. Distance of the point (2, 5) from the line $3x + y + 4 = 0$ measured parallel to the line $3x - 4y + 8 = 0$ is -

(A) 15/2 (B) 9/2 (C) 5 (D) none

30. Three vertices of triangle ABC are A(–1, 11), B(–9, –8) and C(15, –2). The equation of angle bisector of angle A is -

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

31. Given the four lines with the equations

$x + 2y - 3 = 0$, $3x + 4y - 7 = 0$

$2x + 3y - 4 = 0$, $4x + 5y - 6 = 0$

then

(A) they are all concurrent (B) they are the sides of a quadrilateral

(C) only three lines are concurrent (D) none of the above

32. The co-ordinates of the point of reflection of the origin (0, 0) in the line $4x - 2y - 5 = 0$ is -

(A) (1, –2) (B) (2, –1) (C) $\left(\frac{4}{5}, -\frac{2}{5}\right)$ (D) (2, 5)

33. If the axes are rotated through an angle of 30 in the anti-clockwise direction, the coordinates of point $(4, -2\sqrt{3})$ with respect to new axes are-

(A) $(2, \sqrt{3})$ (B) $(\sqrt{3}, -5)$ (C) (2, 3) (D) $(\sqrt{3}, 2)$

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

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

(C) $y + 3x - 9 = 0$, $x + 3y - 3 = 0$ (D) $y - 3x + 9 = 0$, $x + 3y - 3 = 0$

35. The line $(p + 2q)x + (p - 3q)y = p - q$ for different values of p and q passes through a fixed point whose co-ordinates are -

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

36. The equation $2x^2 + 4xy - py^2 + 4x + qy + 1 = 0$ will represent two mutually perpendicular straight lines, if -

(A) p=1 and q = 2 or 6 (B) p = – 2 and q = – 2 or 8

(C) p = 2 and q = 0 or 8 (D) p = 2 and q = 0 or 6

37. Equation of the pair of straight lines through origin and perpendicular to the pair of straight lines $5x^2 - 7xy - 3y^2 = 0$ is -

(A) $3x^2 - 7xy - 5y^2 = 0$ (B) $3x^2 + 7xy + 5y^2 = 0$ (C) $3x^2 - 7xy + 5y^2 = 0$ (D) $3x^2 + 7xy - 5y^2 = 0$

38. 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 co-ordinate axis, then the value of k -

(A) is equal to 1 (B) is equal to –1 (C) is equal to 2 (D) does not exist in the set of real numbers

SELECT THE CORRECT ALTERNATIVES (ONE OR MORE THAN ONE CORRECT ANSWERS)

39. Coordinates of a point which is at 3 units distance from the point (1, –3) on the line $2x + 3y + 7 = 0$ is/are -

(A) $\left(1 + \frac{9}{\sqrt{13}}, 3 - \frac{6}{\sqrt{13}}\right)$ (B) $\left(1 - \frac{9}{\sqrt{13}}, -3 + \frac{6}{\sqrt{13}}\right)$ (C) $\left(1 + \frac{9}{\sqrt{13}}, -3 - \frac{6}{\sqrt{13}}\right)$ (D) $\left(1 - \frac{9}{\sqrt{13}}, 3 - \frac{6}{\sqrt{13}}\right)$

40. The angle between the lines $y - x + 5 = 0$ and $\sqrt{3}x - y + 7 = 0$ is/are -

(A) 15 (B) 60 (C) 165 (D) 75

41. If line $y - x + 2 = 0$ is shifted parallel to itself towards the x-axis by a perpendicular distance of $3\sqrt{2}$ units, then the equation of the new line is may be -

(A) $y = x + 4$ (B) $y = x + 1$ (C) $y = x - (2 + 3\sqrt{2})$ (D) $y = x - 8$

42. Three lines $px + qy + r = 0$, $qx + ry + p = 0$ and $rx + py + q = 0$ are concurrent if -

(A) $p + q + r = 0$ (B) $p^2 + q^2 + r^2 = pr + qr + pq$

(C) $p^3 + q^3 + r^3 = 3pqr$ (D) none of these

43. All points lying inside the triangle formed by the points (1, 3), (5, 0) and (–1, 2) satisfy -

(A) $3x + 2y \geq 0$ (B) $2x + y - 13 \geq 0$ (C) $2x - 3y - 12 \leq 0$ (D) $-2x + y \geq 0$

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

(A) (1, 4) (B) (–1, –4) (C) (–1, 2) (D) (1, –2)

45. Equation of two equal sides of a triangle are the lines $7x + 3y - 20 = 0$ and $3x + 7y - 20 = 0$ and the third side passes through the point (–3, 3), then the equation of the third side can be -

(A) $x + y = 0$ (B) $x - y + 6 = 0$ (C) $x + 3 = 0$ (D) $y = 3$

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	D	A	C	A	D	C	C	D	B	A
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	D	D	A	D	C	C	D	D	C	A
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	A	A	B	C	D	B	D	A	C	B
Que.	31	32	33	34	35	36	37	38	39	40
Ans.	C	B	B	D	D	C	A	B	B,C	A,C
Que.	41	42	43	44	45					
Ans.	A,D	A,B,C	A,C	C,D	A,B					

EXTRA PRACTICE QUESTIONS ON STRAIGHT LINES

SELECT THE CORRECT ALTERNATIVES (ONE OR MORE THAN ONE CORRECT ANSWERS)

1. The co-ordinates of a point P on the line $2x - y + 5 = 0$ such that $|PA - PB|$ is maximum where A is (4, – 2) and B is (2, – 4) will be -

(A) (11, 27) (B) (–11, – 17) (C) (–11, 17) (D) (0, 5)

2. The line $x + y = p$ meets the axis of x and y at A and B respectively. A triangle APQ is inscribed in the triangle OAB, O being the origin, with right angle at Q. P and Q lie respectively on OB and AB. If the area of the triangle APQ is $3/8^{th}$ of the area of the triangle OAB, then $\frac{AQ}{BQ}$ is equal to -

(A) 2 (B) 2/3 (C) 1/3 (D) 3

3. Lines, $L_1 : x + \sqrt{3}y = 2$, and $L_2 : ax + by = 1$, meet at P and enclose an angle of 45 between them. Line $L_3 : y = \sqrt{3}x$, also passes through P then -

(A) $a^2 + b^2 = 1$ (B) $a^2 + b^2 = 2$ (C) $a^2 + b^2 = 3$ (D) $a^2 + b^2 = 4$

4. A triangle is formed by the lines $2x - 3y - 6 = 0$; $3x - y + 3 = 0$ and $3x + 4y - 12 = 0$. If the points $P(\alpha,0)$ and $Q(0,\beta)$ always lie on or inside the ΔABC, then range of α & β -

(A) $\alpha \in [-1, 2]$ & $\beta \in [-2, 3]$ (B) $\alpha \in [-1, 3]$ & $\beta \in [-2, 4]$

(C) $\alpha \in [-2, 4]$ & $\beta \in [-3, 4]$ (D) $\alpha \in [-1, 3]$ & $\beta \in [-2, 3]$

5. 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 -

(A) $3x + 3y - 1 = 0$ (B) $x - 3y + 2 = 0$ (C) $5x + 5y - 3 = 0$ (D) none

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

(A) $5x + 4y = 13$ (B) $5x - 4y = -3$ (C) $4x + 5y = 14$ (D) $4x - 5y = -6$

7. Let the algebraic sum of the perpendicular distances from the points (3, 0), (0, 3) & (2, 2) to a variable straight line be zero, then the line passes through a fixed point whose co-ordinates are-

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

8. The image of the pair of lines respresented by $ax^2 + 2h\,xy + by^2 = 0$ by the line mirror $y = 0$ is :

(A) $ax^2 - 2hxy + by^2 = 0$ (B) $bx^2 - 2h\,xy + ay^2 = 0$

(C) $bx^2 + 2h\,xy + ay^2 = 0$ (D) $ax^2 - 2h\,xy - by^2 = 0$

9. The pair of straight lines $x^2 - 4xy + y^2 = 0$ together with the line $x + y + 4\sqrt{6} = 0$ form a triangle which is :

(A) right angled but not isosscles (B) right isosceles

(C) scalene (D) equilateral

10. Let A ≡ (3, 2) and B ≡ (5, 1). ABP is an equilateral triangle is constructed on the side of AB remote from the origin then the orthocentre of triangle ABP is -

(A) $\left(4 - \frac{1}{2}\sqrt{3}, \frac{3}{2} - \sqrt{3}\right)$ (B) $\left(4 + \frac{1}{2}\sqrt{3}, \frac{3}{2} + \sqrt{3}\right)$ (C) $\left(4 - \frac{1}{6}\sqrt{3}, \frac{3}{2} - \frac{1}{3}\sqrt{3}\right)$ (D) $\left(4 + \frac{1}{6}\sqrt{3}, \frac{3}{2} + \frac{1}{3}\sqrt{3}\right)$

11. The line PQ whose equation is $x - y = 2$ cuts the x axis at P and Q is (4,2). The line PQ is rotated about P through 45 in the anticlockwise direction. The equation of the line PQ in the new position is -

(A) $y = -\sqrt{2}$ (B) $y = 2$ (C) $x = 2$ (D) $x = -2$

12. Distance between two lines respresented by the line pair, $x^2 - 4xy + 4y^2 + x - 2y - 6 = 0$ is -

(A) $\frac{1}{\sqrt{5}}$ (B) $\sqrt{5}$ (C) $2\sqrt{5}$ (D) none

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

(A) (–1, –1) (B) (–2, –2) (C) (0, 0) (D) (–1, –2)

14. Area of the rhombus bounded by the four lines, $ax \pm by \pm c = 0$ is -

(A) $\frac{c^2}{2ab}$ (B) $\frac{2c^2}{ab}$ (C) $\frac{4c^2}{ab}$ (D) $\frac{ab}{4c^2}$

15. If the lines $ax + y + 1 = 0$, $x + by + 1 = 0$ & $x + y + c = 0$ where a, b & c are distinct real numbers different from 1 are concurrent, then the value of $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}=$

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

16. If one vertex of an equilateral triangle of side 'a' lies at the origin and the other lies on the line $x-\sqrt{3}y=0$, then the co-ordinates of the third vertex are -

(A) (0, a) (B) $\left(\frac{\sqrt{3}\ a}{2},-\frac{a}{2}\right)$ (C) (0, –a) (D) $\left(-\frac{\sqrt{3}\ a}{2},\frac{a}{2}\right)$

17. The area enclosed by $2|x| + 3|y| \le 6$ is -

(A) 3 sq. units (B) 4 sq. units (C) 12 sq. units (D) 24 sq. units

18. The point (4, 1) undergoes the following three transformations successively -

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

(ii) Translation through a distance 2 units along the positive directions of x-axis.

(iii) Rotation through an angle $\pi/4$ about the origin.

The final position of the point is given by the coordinates :

(A) $\left(\frac{7}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ (B) $\left(\frac{7}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ (C) $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$ (D) none of these

19. If the equation $ax^2 - 6xy + y^2 + bx + cx + d = 0$ represents a pair of lines whose slopes are m and m^2, then value(s) of a is/are -

(A) $a = -8$ (B) $a = 8$ (C) $a = 27$ (D) $a = -27$

20. Given the family of lines, $a(3x + 4y + 6) + b(x + y + 2) = 0$. The line of the family situated at the greatest distance from the point P (2,3) has equation -

(A) $4x + 3y + 8 = 0$ (B) $5x + 3y + 10 = 0$ (C) $15x + 8y + 30 = 0$ (D) none

21. If the vertices P, Q, R of a triangle PQR are rational points, which of the following points of the triangle PQR is/are always rational point (s) ?

(A) centriod (B) incentre (C) circumcentre (D) orthocentre

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

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

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

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	B	D	B	D	C	A	D	A	D	D
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	C	B	A	B	D	A,B,C,D	C	C	B,D	A
Que.	21	22								
Ans.	A,C,D	B								