Coordinates and Straight Lines

Choose the most appropriate option (a, b, c or d)

Q 1. If two vertices of an equilateral triangle have integral coordinates then the third vertex will have

(a) integral coordinates
(b) coordinates which are rational
(c) at least one coordinate irrational
(d) coordinates which are irrational

Q 2. If the line segment joining (2, 3) and (-1, 2) is divided internally in the ration 3 : 4 by the line x + 2y = k then k is

(a) $\frac{41}{7}$ (b) $\frac{5}{7}$ (c) $\frac{36}{7}$ (d) $\frac{31}{7}$

Q 3. The polar coordinates of the vertices of a triangle are (0, 0) (3, π/2) and (3, π/6). Then the triangle is

(a) right angled (b) isosceles (c) equilateral (d) none of these

Q 4. The point (a, b + c), (b, c + a), (c, a + b) are

(a) vertices of an equilateral triangle
(b) collinear
(c) concyclic
(d) none of these

Q 5. The incentre of the triangle formed by the axes and the line $\frac{x}{a}+\frac{y}{b}=1$ is

(a) $\left(\frac{a}{2},\frac{b}{2}\right)$
(b) $\left(\frac{ab}{a+b+\sqrt{ab}},\frac{ab}{a+b+\sqrt{ab}}\right)$
(c) $\left(\frac{a}{3},\frac{b}{3}\right)$
(d) $\left(\frac{ab}{a+b+\sqrt{a^2+b^2}},\frac{ab}{a+b+\sqrt{a^2+b^2}}\right)$

Q 6. In the ΔABC, the coordinates of B are (0, 0), AB = 2, $\angle$ABC = $\frac{\pi}{3}$ and the middle point of BC has the coordinates (2, 0). The centroid of the triangle is

(a) $\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$ (b) $\left(\frac{5}{3},\frac{1}{\sqrt{3}}\right)$ (c) $\left(\frac{4+\sqrt{3}}{3},\frac{1}{3}\right)$ (d) none of these

Q 7. The coordinates of three consecutive vertices of a parallelogram are (1, 3), (-1, 2) and (2, 5). The coordinates of the fourth vertex are

(a) (6, 4) (b) (4, 6) (c) (-2, 0) (d) none of these

Q 8. The area of the pentagon whose vertices are (4, 1), (3, 6), (-5, 1), (-3, -3) and (-3, 0) is

(a) 30 unit^2 (b) 60 unit^2 (c) 120 unit^2 (d) none of these

Q 9. A point moves in the x-y plane such that the sum of its distances from two mutually perpendicular lines is always equal to 3. The area enclosed by the locus of the point is

(a) 18 $unit^2$ (b) $\frac{9}{2}$ $unit^2$ (c) 9 $unit^2$ (d) none of these

Q 10. Let A = (1, 2), B = (3, 4) and let C = (x, y) be a point such that $(x - 1)(x - 3) + (y - 2)(y - 4) = 0$. If ar ($\Delta$ABC) = 1 then maximum number of positions of C in the x-y plane is

(a) 2 (b) 4 (c) 8 (d) none of these

Q 11. The points (α, β), (γ, δ), (α, δ) and (γ, β) taken in order, where α, β, γ, δ are different real numbers, are

(a) collinear (b) vertices of a square (c) vertices of a rhombus (d) concyclic

Q 12. The diagonals of a parallelogram PQRS are along the lines $x + 3y = 4$ and $6x - 2y = 7$. The PQRS must be a

(a) rectangle (b) square (c) cyclic quadrilateral (d) rhombus

Q 13. The coordinates of the four vertices of a quadrilateral are (-2, 4), (-1, 2), (1, 2) and (2, 4) taken in order. The equation of the line passing through the vertex (-1, 2) and dividing the quadrilateral in two equal areas is

(a) $x + 1 = 0$ (b) $x + y = 1$ (c) $x - y + 3 = 0$ (d) none of these

Q 14. 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

Q 15. The equation of the straight line which bisects the intercepts made by the axes on the line $x + y = 2$ and $2x + 3y = 6$ is

(a) $2x = 3$ (b) $y = 1$ (c) $2y = 3$ (d) $x = 1$

Q 16. The equation of a straight line passing through the point (-2, 3) and making intercepts of equal length on the axes is

(a) $2x + y + 1 = 0$ (b) $x - y = 5$ (c) $x - y + 5 = 0$ (d) none of these

Q 17. The foot of the perpendicular on the line $3x + y = \lambda$ drawn from the origin is C. If the line cuts the x-axis and y-axis at A and B respectively then BC : CA is

(a) 1 : 3 (b) 3 : 1 (c) 1 : 9 (d) 9 : 1

Q 18. The distance of the line $2x - 3y = 4$ from the point (1, 1) in the direction of the lien $x + y = 1$ is

(a) $\sqrt{2}$ (b) $5\sqrt{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) none of these

Q 19. The four sides of a quadrilateral are given by the equation $xy(x - 2)(y - 3) = 0$. The equation of the line parallel to $x - 4y = 0$ that divides the quadrilateral in two equal areas is

(a) $x - 4y + 5 = 0$ (b) $x - 4y - 5 = 0$ (c) $4y = x + 1$ (d) $4y + 1 = x$

Q 20. The coordinates of two consecutive vertices A and B of a regular hexagon ABCDEF are (1, 0) and (2, 0) respectively. The equation of the diagonal CE is

(a) $\sqrt{3}x + y = 4$ (b) $x + \sqrt{3}y + 4 = 0$ (c) $x + \sqrt{3}y = 4$ (d) none of these

Q 21. ABC is an isosceles triangle in which A is (-1, 0), $\angle A = 2\pi/3$, AB = AC and AB is along the x-axis. If BC = $4\sqrt{3}$ then the equation of the line BC is

(a) $x + \sqrt{3}y = 3$ (b) $\sqrt{3}x + y = 3$ (c) $x + y = \sqrt{3}$ (d) none of these

Q 22. The graph of the function $\cos x \,.\, \cos(x + 2) - \cos^2(x + 1)$ is a

(a) straight line passing through the point $(0, -\sin^2 1)$ with slope 2

(b) straight line passing through the origin

(c) parabola with vertex $(1, -\sin^2 1)$

(d) straight line passing through the point $(\pi/2, -\sin^2 1)$ and parallel to the x-axis

Q 23. If the points (-2, 0), $(-1, 1/\sqrt{3})$ and $(\cos\theta, \sin\theta)$ are collinear then the number of value of $\theta \in [0, 2\pi]$ is

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

Q 24. The limiting position of the point of intersection of the lines $3x + 4y = 1$ and $(1 + c)x + 3c^2y = 2$ as c tends to 1 is

(a) (-5, 4) (b) (5, -4) (c) (4, -5) (d) none of these

Q 25. The coordinate of the point on the x-axis which is equidistant from the points (-3, 4) and (2, 5) are

(a) (20, 0) (b) (-23, 0) (c) $\left(\frac{4}{5}, 0\right)$ (d) none of these

Q 26. The distance between the line $3x + 4y = 9$ and $6x + 8y + 15 = 0$ is

(a) $\frac{3}{10}$ (b) $\frac{33}{10}$ (c) $\frac{33}{5}$ (d) none of these

Q 27. If a vertex of an equilateral triangle is the origin and the side opposite to it has the equation $x + y = 1$ then the orthocenter of the triangle is

(a) $\left(\frac{1}{3}, \frac{1}{3}\right)$ (b) $\left(\frac{\sqrt{2}}{3}, \frac{\sqrt{2}}{3}\right)$ (c) $\left(\frac{2}{3}, \frac{2}{3}\right)$ (d) none of these

Q 28. The equation of the three sides of a triangle are x = 2, y + 1 = 0 and x + 2y = 4. The coordinates of the circumcentre of the triangle are

(a) (4, 0) (b) (2, -1) (c) (0, 4) (d) none of these

Q 29. 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

Q 30. ABC is an equilateral triangle such that the vertices B and C lie on two parallel lines at a distance 6. If A lies between the parallel lines at a distance 4 from one of them the length of a side of the equilateral triangle is

(a) 8 (b) $\sqrt{\frac{88}{3}}$ (c) $\frac{4\sqrt{7}}{\sqrt{3}}$ (d) none of these

Q 31. If p and p' are the perpendiculars from the origin upon the lines x sec θ + y cosec θ = a and x cos θ - y sin θ = a cos 2θ respectively then

(a) $4p^2 + p'^2 = a^2$ (b) $p^2 + 4p'^2 = a^2$ (c) $p^2 + p'^2 = a^2$ (d) none of these

Q 32. Let the perpendiculars from any point on the line 2x + 11y = 5 upon the lines 24x + 7y = 20 and 4x – 3y = 2 have the lengths p and p' respectively. Then

(a) 2p = p' (b) p = p' (c) p = 2p' (d) none of these

Q 33. If P(1 + t/ $\sqrt{2}$) be any point on a line then the range of values of t for which the point P lies between the parallel lines x + 2y = 1 and 2x + 4y = 15 is

(a) $-\frac{4\sqrt{2}}{5} < t < \frac{5\sqrt{2}}{6}$ (b) $0 < t < \frac{5\sqrt{2}}{6}$ (c) $-\frac{4\sqrt{2}}{5} < t < 0$ (d) none of these

Q 34. There are two parallel lines, one of which has the equation 3x + 4y = 2. If the lines cut an intercept of length 5 on the line x + y = 1 then the equation of the other line is

(a) $3x + 4y = \frac{\sqrt{6} - 2}{2}$ (b) $3x + 4y = \frac{\sqrt{6} + 2}{2}$ (c) $3x + 4y = 7$ (d) none of these

Q 35. If the intercept made on the line y = mx by lines y = 2 and y = 6 is less than 5 then the range of values of m is

(a) $\left(-\infty, -\frac{4}{3}\right) \cup \left(\frac{4}{3}, +\infty\right)$ (b) $\left(-\frac{4}{3}, \frac{4}{3}\right)$ (c) $\left(-\frac{3}{4}, \frac{3}{4}\right)$ (d) none of these

Q 36. If a, b, c are any three terms of an AP then the line ax + by + c = 0

(a) has a fixed direction (b) always passes through a fixed point

(c) always cuts intercepts on the axes such that their sum is zero

(d) forms a triangle with the axes whose area is constant

Q 37. If a, c, b are in GP then the line $ax + by + c = 0$

(a) has a fixed direction (b) always passes through a fixed point

(c) forms a triangle with the axes whose area is constant

(d) always cuts intercepts on the axes such that their sum is zero

Q 38. The number of real values of k for which the lines $x - 2y + 3 = 0$, $kx + 3y + 1 = 0$ and $4x - ky + 2 = 0$ are concurrent is

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

Q 39. A family of lines is given by $(1 + 2\lambda)x + (1 - \lambda)y + \lambda = 0$, λ being the parameter. The line belonging to this family at the maximum distance from the point (1, 4) is

(a) $4x - y + 1 = 0$ (b) $33x + 12y + 7 = 0$ (c) $12x + 33y = 7$ (d) none of these

Q 40. The members of the family of lines $(\lambda + \mu)x + (2\lambda + \mu)y = \lambda + 2\mu$, where $\lambda \neq 0$, $\mu \neq 0$, pass through the point

(a) (3, -1) (b) (-3, 1) (c) (1, 1) (d) none of these

Q 41. The equations of the sides AB, BC and CA of the ΔABC are $y - x = 2$, $x + 2y = 1$ and $3x + y + 5 = 0$ respectively. The equation of the altitude through B is

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

Q 42. The range of values of the ordinate of a point moving on the line $x = 1$, and always remaining in the interior of the triangle formed by the lines $y = x$, the x-axis and $x + y = 4$, is

(a) (0, 1) (b) [0, 1] (c) [0, 4] (d) none of these

Q 43. If the point (a, a) falls between the lines $|x + y| = 2$ then

(a) $|a| = 2$ (b) $|a| = 1$ (c) $|a| < 1$ (d) $|a| < \frac{1}{2}$

Q 44. If $A(\sin \alpha, 1/\sqrt{2})$ and $B(1/\sqrt{2}, \cos \alpha)$, $-\pi \leq \alpha \leq \pi$, are two point on the same side of the line $x - y = 0$ then α belongs to the interval

(a) $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right) \cup \left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$ (b) $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$ (c) $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$ (d) none of these

Q 45. The straight lines $L_1 \equiv 4x - 3y + 2 = 0$, $L_2 \equiv 3x + 4y - 4 = 0$ and $L_3 \equiv x - 7y + 6 = 0$

(a) form a right-angled triangle (b) from a right-angled isosceles triangle

(c) are concurrent (d) none of these

Q 46. The equation of bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is

(a) $x + y + 5 = 0$ (b) $x - y + 1 = 0$ (c) $x - y = 5$ (d) none of these

Q 47. The equation of the bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is

(a) $(\sqrt{5} - 2\sqrt{2})x + (\sqrt{5} + \sqrt{2})y = 3\sqrt{5} - 2\sqrt{2}$ (b) $(\sqrt{5} + 2\sqrt{2})x + (\sqrt{5} - \sqrt{2})y = 3\sqrt{5} + 2\sqrt{2}$

(c) $3x = 10$ (d) none of these

Q 48. Two lines $2x - 3y = 1$ and $x + 2y + 3 = 0$ divide the x-y plane in four compartments which are named as shown in figure. Consider the locations of the points (2, -1), (3, 2) and (-1, -2). We get

(a) $(2, -1) \in IV$ (b) $(3, 2) \in III$ (c) $(-1, -2) \in II$ (d) none of these

Figure

Q 49. If the lines $y - x = 5$, $3x + 4y = 1$ and $y = mx + 3$ are concurrent then the value of m is

(a) $\frac{19}{5}$ (b) 1 (c) $\frac{5}{19}$ (d) none of these

Q 50. If the point $(\cos\theta, \sin\theta)$ does not fall in that angle between the lines $y = |x - 1|$ in which the origin lies then θ belongs to

(a) $\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$ (b) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ (c) $(0, \pi)$ (d) none of these

Q 51. The points (-1, 1) and (1, -1) are symmetrical about the line

(a) $y + x = 0$ (b) $y = x$ (c) $x + y = 1$ (d) none of these

Q 52. The equations of the line segment AB is $y = x$. If A and B lie on the same side of the line mirror $2x - y = 1$, the image of AB has the equation

(a) $x + y = 2$ (b) $8x + y = 9$ (c) $7x - y = 6$ (d) none of these

Q 53. Let P = (1, 1) and Q = (3, 2). The point R on the x-axis such that PR + RQ is the minimum is

(a) $\left(\frac{5}{3}, 0\right)$ (b) $\left(\frac{1}{3}, 0\right)$ (c) (3, 0) (d) none of these

Q 54. If a ray travelling along the $x = 1$ gets reflected from the line $x + y = 1$ then the equation of the line along which the reflected ray travels is

(a) $y = 0$ (b) $x - y = 1$ (c) $x = 0$ (d) none of these

Q 55. The point P(2, 1) is shifted by $3\sqrt{2}$ parallel to the line $x + y = 1$, in the direction of increasing ordinate, to reach Q. The image of Q by the line $x = y = 1$ is

(a) (5, -2) (b) (-1, 4) (c) (3, -4) (d) (-3, 2)

Q 56. Let A = (1, 0) and B = (2, 1). The line AB turns about A through an angle $\pi/6$ in the clockwise sense, and the new position of B is B'. Then B' has the coordinates

(a) $\left(\frac{3+\sqrt{3}}{2}, \frac{\sqrt{3}-1}{2}\right)$ (b) $\left(\frac{3-\sqrt{3}}{2}, \frac{\sqrt{3}+1}{2}\right)$ (c) $\left(\frac{1-\sqrt{3}}{2}, \frac{1+\sqrt{3}}{2}\right)$ (d) none of these

Q 57. A line has intercepts a, b on the coordinate axes. If the axes are rotated about the origin through an angle α then the line has intercepts p, q on the new position of the axes respectively. Then

(a) $\frac{1}{p^2}+\frac{1}{q^2}=\frac{1}{a^2}+\frac{1}{b^2}$ (b) $\frac{1}{p^2}-\frac{1}{q^2}=\frac{1}{a^2}-\frac{1}{b^2}$ (c) $\frac{1}{p^2}+\frac{1}{a^2}=\frac{1}{q^2}+\frac{1}{b^2}$ (d) none of these

Q 58. Two points A and B move on the x-axis and the y-axis respectively such that the distance between the two points is always the same. The locus of the middle point of AB is

(a) a straight line (b) a pair of straight line (c) a circle (d) none of these

Q 59. Three vertices of a quadrilateral in order are (6, 1), (7. 2) and (-1, 0). If the area of the quadrilateral is 4 unit^2 then the locus of the fourth vertex has the equation

(a) $x - 7y = 1$ (b) $x - 7y + 15 = 0$

(c) $(x - 7y)^2 + 14(x - 7y) - 15 = 0$ (d) none of these

Q 60. A variable line through the point (a, b) cuts the axes of reference at A and B respectively. The lines through A and B parallel to the y-axis and the x-axis respectively meet at P. Then the locus of P has the equation

(a) $\frac{x}{a}+\frac{y}{b}=1$ (b) $\frac{x}{b}+\frac{y}{a}=1$ (c) $\frac{a}{x}+\frac{b}{y}=1$ (d) $\frac{b}{x}+\frac{a}{y}=1$

Choose the correct options. One or more options may be correct.

Q 61. If the coordinates of the vertices of a triangle are rational numbers then which of the following points of the triangle will always have rational coordinates ?

(a) centroid (b) Incentre (c) Circumcentre (d) Orthocentre

Q 62. Two consecutive vertices of a rectangle of area 10 unit^2 are (1, 3) and (-2, -1). Other two vertices are

(a) $\left(-\frac{3}{5},\frac{21}{5}\right),\left(-\frac{18}{5},\frac{1}{5}\right)$ (b) $\left(-\frac{3}{5},-\frac{21}{5}\right),\left(-\frac{2}{5},-\frac{11}{5}\right)$ (c) $\left(-\frac{2}{5},-\frac{11}{5}\right),\left(\frac{13}{5},\frac{9}{5}\right)$ (d) $\left(\frac{13}{5},\frac{9}{5}\right),\left(-\frac{18}{5},\frac{1}{5}\right)$

Q 63. The ends of a diagonal of a square are (2, -3) and (-1, 1). Another vertex of the square can be

(a) $\left(-\frac{3}{2},-\frac{5}{2}\right)$ (b) $\left(\frac{5}{2},\frac{1}{2}\right)$ (c) $\left(\frac{1}{2},\frac{5}{2}\right)$ (d) none of these

Q 64. If each of the vertices of a triangle has integral coordinates then the triangle may be

(a) right angled (b) equilateral (c) isosceles (d) none of these

Q 65. If (-1, 2), (2, -1) and (3, 1) are any three vertices of a parallelogram then the fourth vertex (a, b) will be such that

(a) a = 2, b = 0 (b) a = -2, b = 0 (c) a = -2, b = 6 (d) a = 6, b = -2

Q 66. If (α, β) be an end of a diagonal of a square and the other diagonal has the equation $x - y = \alpha$ then another vertex of the square can be

(a) $(\alpha - \beta, \alpha)$ (b) $(\alpha, 0)$ (c) $(0, -\alpha)$ (d) $(\alpha + \beta, \beta)$

Q 67. A point on the line y = x whose perpendicular distance from the line $\frac{x}{4}+\frac{y}{3}=1$ is 4 has the coordinates

(a) $\left(-\frac{8}{7},-\frac{8}{7}\right)$ (b) $\left(\frac{32}{7},\frac{32}{7}\right)$ (c) $\left(\frac{3}{2},\frac{3}{2}\right)$ (d) none of these

Q 68. The parametric equation of a line is given by

$$x=-2+\frac{r}{\sqrt{10}} \text{ and } y=1+3\frac{r}{\sqrt{10}}$$

Then, for the line

(a) intercept on the x-axis = $\frac{7}{3}$ (b) intercept on the y-axis = -7

(c) slope of the line = $\tan^{-1}\frac{1}{3}$ (d) slope of the line = $\tan^{-1} 3$

Q 69. One side of a square of length a is inclined to the x-axis at an angle α with one of the vertices of the square at the origin. The equation of a diagonal of the square is

(a) $y(\cos\alpha - \sin\alpha) = x(\cos\alpha + \sin\alpha)$ (b) $y(\cos\alpha + \sin\alpha) = x(\cos\alpha - \sin\alpha)$

(c) $y(\sin\alpha + \cos\alpha) - x(\sin\alpha - \cos\alpha) = a$ (d) $y(\sin\alpha + \cos\alpha) + x(\sin\alpha - \cos\alpha) = a$

Q 70. If the equations of the hypotenuse and a side of a right-angled isosceles triangles be x + my = 1 and x = k respectively then

(a) m = 1 (b) m = k (c) m = -1 (d) m + k = 0

Q 71. The centroid and a vertex of an equilateral triangle are (1, 1) and (1, 2) respectively. Another vertex of the triangle can be

(a) $\left(\frac{2-\sqrt{3}}{2},\frac{1}{2}\right)$ (b) $\left(\frac{2+3\sqrt{3}}{2},\frac{1}{2}\right)$ (c) $\left(\frac{2+\sqrt{3}}{2},\frac{1}{2}\right)$ (d) none of these

Q 72. If one vertex of an equilateral triangle of side 2 is the original and another vertex lies on the line x = $\sqrt{3}$y then the third vertex can be

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

Q 73. A line passing through the point (2, 2) and the axes enclose an area λ. The intercepts on the axes made by the line are given by the two roots of

(a) $x^2 - 2|\lambda|x + |\lambda| = 0$ (b) $x^2 + |\lambda|x + 2|\lambda| = 0$ (c) $x^2 - |\lambda|x + 2|\lambda| = 0$ (d) none of these

Q 74. A line passing through the origin and making an angle $\pi/4$ with the line y – 3x = 5 has the equation

(a) x + 2y = 0 (b) 2x = y (c) x = 2y (d) y + 2x = 0

Q 75. The coordinates of a point on the line x + y = 3 such that the point is at equation distance from the line |x| = |y| are

(a) (3, 0) (b) (0, 3) (c) (-3, 0) (d) (0, -3)

Q 76. A line perpendicular to the line 3x – 2y = 5 cuts off an intercept 3 on the positive side of the x-axis. Then

(a) the slope of the line is $\frac{2}{3}$ (b) the intercept on the y-axis is 2

(c) the area of the triangle formed by the line with the axes is 3 unit^2 (d) none of these

Q 77. One diagonal of a square is the portion of the line $\sqrt{3}x + y = 2\sqrt{3}$ intercepted by the axes. Then an extremity of the other diagonal is

(a) $(1+\sqrt{3}, \sqrt{3}-1)$ (b) $(1+\sqrt{3}, \sqrt{3}+1)$ (c) $(1-\sqrt{3}, \sqrt{3}-1)$ (d) $(1-\sqrt{3}, \sqrt{3}+1)$

Q 78. If bx + cy = a, where a, b, c are of the same sign, be a line such that the area enclosed by the line and the axes of reference is $\frac{1}{8}$ unit^2 then

(a) b, a, c are in GP (b) a, 2a, c are in GP (c) b, $\frac{a}{2}$, c are in AP (d) b, -2a, c are in GP

Q 79. The sides of a triangle are x + y = 1, 7y = x and $\sqrt{3}y + x = 0$. Then the following is an interior point of the triangle.

(a) Circumcentre (b) Centroid (c) Incentre (d) Orthocentre

Q 80. If (x, y) be a variable point on the line y = 2x lying between the lines 2(x + 1) + y = 0 and x + 3(y – 1) = 0 then

(a) $x \in \left(-\frac{1}{2}, \frac{6}{7}\right)$ (b) $x \in \left(-\frac{1}{2}, \frac{3}{7}\right)$ (c) $y \in \left(-1, \frac{3}{7}\right)$ (d) $y \in \left(-1, \frac{6}{7}\right)$

Q 81. If the equations of the three sides of a triangle are x + y = 1, 3x + 5y = 2 and x – y = 0 then the orthocenter of the triangle lies on the line

(a) 5x – 3y = 2 (b) 3x – 5y + 1 = 0 (c) 2x – 3y = 1 (d) 5x – 3y = 1

Q 82. A ray travelling along the line 3x – 4y = 5 after being reflected from a line l travels along the line 5x + 12y = 13. Then the equation of the line l is

(a) x + 8y = 0 (b) x = 8y (c) 32x + 4y = 65 (d) 32x – 4y + 65 = 0

Q 83. A ray of light travelling along the line x + y = 1 is incident on the x-axis and after refraction it enters the other side of the x-axis by turning $\pi/6$ away from the x-axis. The equation of the line along which the refracted ray travels is

(a) $x+(2-\sqrt{3})y=1$ (b) $(2-\sqrt{3})x+y=1$ (c) $y+(2+\sqrt{3})x=2+\sqrt{3}$ (d) none of these

1c	2a	3c	4b	5d	6b	7b	8a	9a	10b
11d	12d	13c	14a	15b	16c	17d	18a	19a	20c
21a	22d	23b	24a	25d	26b	27a	28a	29a	30c
31a	32b	33a	34d	35a	36b	37c	38a	39c	40a
41b	42a	43c	44a	45c	46b	47a	48a	49c	50b
51b	52c	53a	54a	55d	56a	57a	58c	59c	60c
61acd	62ac	63ab	64acd	65bd	66bd	67ab	68d	69ac	70ac
71ac	72ab	73c	74cd	75ab	76bc	77bc	78bd	79bc	80bd
81bd	82bc	83ac							