1. The nearest point on the line 3x – 4y = 25 from the origin is
(a) (– 4, 5) (b) (3, – 4) (c) (3, 4) (d) (3, 5)

2. The image of the point (– 1, 3) by the line x – y = 0 is
(a) (3, – 1) (b) (1, – 3) (c) (– 1, – 1) (d) (3, 3)

3. The straight line passing through the point of intersection of the straight lines x – 3y + 1 = 0 and 2x + 5y – 9 = 0 and having infinite slope has the equation
(a) x = 2 (b) 3x + y – 1 = 0 (c) y = 1 (d) none of these

4. If a, b, c be in A.P. then ax + by + c = 0 represents
(a) a single line (b) a family of concurrent lines
(c) a family of parallel lines (d) none of these

5. The line (p + 2q)x + (p – 3q)y = p – q for different values of p and q passes through the point
(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) $\left(\frac{2}{5}, \frac{3}{5}\right)$

6. 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

7. 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

8. The points (a, b + c), (b, c + a), (c, a + b) are
(a) vertices of an equilateral triangle (b*) collinear
(c) concyclic (d) none of these

9. The in centre 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*) $\left(\frac{ab}{a+b+\sqrt{a^2+b^2}}, \frac{ab}{a+b+\sqrt{a^2+b^2}}\right)$

10. In the ΔABC, the coordinates of B are (0, 0), AB = 2, ∠ABC = π/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*) $\left(\frac{5}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$ (c) $\left(\frac{4+\sqrt{3}}{3}, \frac{1}{3}\right)$ (d) none of these

11. 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

12. 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) 9/2 $unit^2$ (c) 9 $unit^2$ (d) none of these

13. The points (α, β), (γ, δ) and (γ, β), where $\alpha, \beta, \gamma, \delta$ are different real numbers, are
(a) collinear (b*) vertices of a square
(c) vertices of a rhombus (d) concyclic

14. The diagonals of a parallelogram PQRS are along the lines $x + 3y = 4$ and $6x - 2y = 7$. Then PQRS must be a
(a) rectangle (b) square (c) cyclic quadrilateral (d*) rhombus

15. 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*) $9x - 20y + 96 = 6$ (b) $9x + 20y = 24$
(c) $20x + 9y + 53 = 0$ (d) none of these

16. The equation of the straight line which bisects the intercepts made by the axes on the lines $x + y = 2$ and $2x + 3y = 6$ is
(a) $2x = 3$ (b*) $y = 1$ (c) $2y = 3$ (d) $x = 1$

17. 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

18. 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

19. 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

20. 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

21. If the points $(-2, 0)$, $(-1, 1/\sqrt{3})$ and $(\cos\theta, \sin\theta)$ are collinear then the number of values of $\theta \in [0, 2\pi]$ is
(a) 0 (b*) 1 (c) 2 (d) infinite

22. The limiting position of the point of intersection of the lines $3x + 4y = 1$ & $(1 + c)x + 3c^2y = 2$ as c tends to 1 is
(a*) $(-5, 4)$ (b) $(5, -4)$ (c) $(4, -5)$ (d) none of these

23. The distance between the lines $3x + 4y = 9$ and $6x + 8y + 15 = 0$ is
(a) 3/10 (b*) 33/10 (c) 33/5 (d) none of these

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

25. The equations 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

26. 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

27. 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

28. If $P(1 + t/\sqrt{2}, 2 + t/\sqrt{2})$ 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*) $-\dfrac{4\sqrt{2}}{5} < t < \dfrac{5\sqrt{2}}{6}$ (b) $0 < t < \dfrac{5\sqrt{2}}{6}$

(c) $-\dfrac{4\sqrt{2}}{5} < t < 0$ (d) none of these

29. 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

30. 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