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Class: XI
Subject: Math's
Topic: Introduction to 3D Geometry
No. of Questions: 25

1. Two points (a, 3) and (5, b) are the opposite vertices of a rectangle. If the other two vertices lie on the line y = 2x + c which passes through the point (a, b) then the value of c is

A. 7
B. 4
C. 0
D. 7

2. The line parallel to x-axis passing through the intersection of the lines ax + 2by + 3b = 0 and bx – 2ay – 3a = 0 where (a, b) $\neq$ (0, 0) is

A. above x-axis at a distance 3/2 from it
B. above x-axis at a distance 2/3 from it
C. below x-axis at a distance 3/2 from it
D. below x-axis at a distance 2/3 from it

3. Locus of mid point of the portion between the axes of x cos $\alpha$ + y sin $\alpha$ = p, where p is constant is

A. $x^2 + y^2 = 4/p^2$
B. $x^2 + y^2 = 4p^2$
C. $1/x^2 + 1/y^2 = 2/p^2$
D. $1/x^2 + 1/y^2 = 4/p^2$

4. Q, R and S are the points on the line joining the points P (a, x) and T (b, y) such that PQ = QR = RS = ST, then $\left(\frac{5a+3b}{8}, \frac{5x+3y}{8}\right)$ is the mid point of the segment

A. PQ
B. QR
C. RS
D. ST

5. An equation of a straight line passing through the inter-section of the straight lines 3x – 4y + 1 = 0 and 5x + y – 1 = 0 and making non-zero, equal intercepts on the axes is

A. 22x + 22y = 13
B. 23x + 23y = 11
C. 11x + 11y = 23
D. 8x – 3y = 0

6. The lines $p(p^2 + 1)x – y + q = 0$ and $(p^2 + 1)^2x + (p^2 + 1)y + 2q = 0$ are perpendicular to a common line for

A. exactly two values of p
B. more than two values of p
C. no value of p
D. exactly one value of p

7. The area enclosed by $2|x| + 3|y| \leq 6$ is

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

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8. 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. The point O divides the segment PQ in the ratio

A. 1 : 2
B. 3 : 4
C. 2 : 1
D. 4 : 3

9. If area of the triangle formed by the line L perpendicular to $5x – y = 1$ and the coordinate axes is 5, then the distance of L from the origin is

A. $5\sqrt{2}$
B. $5/\sqrt{13}$
C. $5\sqrt{13}$
D. None of these

10. If the circumcentre of a triangle lies at the point (a, a) and the centroid is the mid-point of the line joining the points (2a + 3, a + 4) and (a – 4, 2a – 3); then the orthocentre of the triangle lies on the line

A. y = x
B. (a – 1) x + (a + 1) y = 0
C. (a – 1) x – (a + 1) y = 0
D. (a + 1) x – (a – 1) y = 2a

11. If $y = m_i x + \frac{1}{m_i}$ (i = 1, 2, 3) represents three straight lines whose slopes are the roots of the equation. $2m^3 – 3m^2 – 3m + 2 = 0$, A and B are the algebraic sum of the intercepts made by the lines on x-axis and y-axis respectively, then $\alpha A + \beta B = 0$ if $(\alpha, \beta)$ is

A. (4, 7)
B. (2, 7)
C. (7, 2)
D. (– 1, – 7)

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12. If the slope of one of the lines given by $6x^2 + axy + y^2 = 0$ exceeds the slope of the other by one, then a is equal to

A. $\pm 2$
B. 5
C. - 5
D. $\pm 5$

13. The line $\frac{x}{3} + \frac{y}{4} = 1$ meets the axis of y and axis of x at A and B respectively. A square ABCD is constructed on the line segment AB away from the origin, the coordinates of the vertex of the square farthest from the origin are

A. (7, 3)
B. (4, 7)
C. (6, 4)
D. (3, 8)

14. If the lines $x + ay + a = 0$, $bx + y + b = 0$ and $cx + cy + 1 = 0$ (a, b, c being distinct and $\neq 1$) are concurrent, then the value of $\frac{a}{a-1} + \frac{b}{b-1} + \frac{c}{c-1}$ is

A. 1
B. 0
C. 1
D. None of these

15. The mid points of the sides AB and AC of a triangle ABC are (2, – 1) and (– 4, 7) respectively, then the length of BC is

A. 10
B. 20
C. 25
D. 30

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16. If the vertices A and B of a triangle ABC are given by (2, 5) and (4, – 11) and C moves along the line $L_1$ : 9x + 7y + 4 = 0, the locus of the centroid of the triangle ABC is a straight line parallel to

A. AB
B. BC
C. CA
D. $L_1$

17. In a right angled triangle ABC right angled at C; CA = a, CB = b. If the angular points A and B slide along x-axis and y-axis respectively then C lies on

A. $bx \pm ay = 0$
B. $ax \pm by = 0$
C. $\frac{x}{a} \pm \frac{y}{b} = 1$
D. $\frac{x}{b} + \frac{y}{a} = 1$

18. If the circumcentre of a triangle lies at the point (a, a) and the centroid is the mid-point of the line joining the points (2a + 3, a + 4) and(a – 4, 2a – 3); then the orthocentre of the triangle lies on the line

A. y = x
B. (a – 1) x + (a + 1) y = 0
C. (a – 1) x – (a + 1) y = 0
D. (a + 1) x – (a – 1) y = 2a

19. If A ($at^2$, 2at), B($a/t^2$, – 2a/t) and S (a, 0) are three points, then $\frac{1}{SA} + \frac{1}{SB}$ is independent of

A. a
B. t
C. both a and t
D. none of these

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20. The equation $ax^2 + 2hxy + ay^2 = 0$ represent a pair of coincident lines through the origin if

A. h = 2a
B. 2h = a
C. $h^2 = a$
D. $h^2 = a^2$

21. Find the co-ordinates of the points which trisects the line segment PQ formed by joining the point P(4, 2, -6) and Q (10, -16,6)

22. Show that the point P(1, 2, 3), Q (-1, -2, -1), R(2,3,2) and S (4, 7, 6) taken in order form the vertices of a parallelogram. Do these form a rectangle?

23. A point R with xco-ordinates 4 lies on the line segment joining the points P(2,-3, 4) and Q (8, 0, 10) find the co-ordinates of the point R

24. If the points P(1, 0, -6), Q (-3, P,q) and R(-5, 9,6) are collinear, find the values of P and q

25. Three consecutive vertices of a parallelogram ABCD are A (3, -1, 2), B (1, 2, -4) and C (-1, 1, 2) find forth vertex D