1. The centroid of a triangle is (2,3) and two of its vertices are (5,6) and (–1,4). The third vertex of the triangle is- **[AIEEE-2002]**

(1) (2,1) (2) (2,–1)

(3) (1,2) (4) (1,–2)

2. The incentre of the triangle with vertices $(1,\sqrt{3})$, (0,0) and (2,0) is- **[AIEEE-2002]**

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

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

3. 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]**

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

4. 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, 2011]**

(1) 2x + 3y = 9 (2) 2x – 3y = 7

(3) 3x + 2y = 5 (4) 3x –2y = 3

5. Let P be the point (1,0) and Q a point on the curve $y^2 = 8x$. The locus of mid point of PQ is- **[AIEEE-2005]**

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

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

6. 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]**

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

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

7. A straight line passing through the point A(3,4) is such that its intercept between the axes is bisected at A. Then its equation is- **[AIEEE 2006]**

(1) 3x – 4y + 7 = 0 (2) 4x + 3y = 24

(3) 3x + 4y = 25 (4) x + y = 7

8. Let P(–1,0) Q=(0,0) and R(3, $3\sqrt{3}$) be three points. The equation of the bisector of the angle PQR is- **[AIEEE 2007], [IIT Scr. 2002]**

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

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

9. 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]**

(1) 1 (2) 2 (3) –2 (4) –4

10. The lines $p(p^2 + 1)x - y + q = 0$ and $(p^2 + 1)^2x + (p^2 + 1)y + 2q = 0$ are **[AIEEE 2009]**

Perpendicular to a common line for :

(1) Exactly two values of p

(2) More than two values of p

(3) No value of p

(4) Exactly one value of p

11. 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]**

(1) $\frac{23}{\sqrt{15}}$ (2) $\sqrt{17}$ (3) $\frac{17}{\sqrt{15}}$ (4) $\frac{23}{\sqrt{17}}$

12. 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]**

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

13. If the point (1, a) lies in between the straight lines x + y = 1 and 2(x + y) = 3 then a lies in interval :- **[AIEEE-2012 (Online)]**

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

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

14. If two vertices of a triangle are (5, –1) and(–2, 3) and its orthocentre is at (0, 0), then the third vertex is :- **[AIEEE-2012 (Online)]**

(1) (4, –7) (2) (–4, 7)

(3) (–4, –7) (4) (4, 7)

15. 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 : **[JEE(Main)-2013]**

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

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

16. A ray of light along $x+\sqrt{3}y=\sqrt{3}$ gets reflected upon reaching x-axis, the equation of the reflected ray is : **[JEE(Main)-2013]**

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

(3) $y=\sqrt{3}x-\sqrt{3}$ (4) $\sqrt{3}y=x-1$

17. 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]**

(1) 2bc – 3ad = 0 (2) 2bc + 3ad = 0

(3) 3bc – 2ad = 0 (4) 3bc + 2ad = 0

18. 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]**

(1) 4x – 7y – 11 = 0

(2) 2x + 9y + 7 = 0

(3) 4x + 7y + 3 = 0

(4) 2x – 9y – 11 = 0

19. Given three points P, Q, R with P(5, 3) and R lies on the x-axis. If equation of RQ is x – 2y = 2 and PQ is parallel to the x-axis, then the centroid of ΔPQR lies on the line: **[JEE (Main)-2014 (Online)]**

(1) x – 2y + 1 = 0 (2) 5x – 2y = 0

(3) 2x + y – 9 = 0 (4) 2x – 5y = 0

20. Ihe base of an equilateral triangle is along the line given by 3x + 4y = 9. If a vertex of the triangle is (1, 2), then the length of a side of the triangle is : **[JEE (Main)-2014 (Online)]**

(1) $\frac{4\sqrt{3}}{15}$ (2) $\frac{4\sqrt{3}}{5}$ (3) $\frac{2\sqrt{3}}{15}$ (4) $\frac{2\sqrt{3}}{5}$

21. If the three distinct lines

x + 2ay + a = 0, x + 3by + b = 0 and

x + 4ay + a = 0 are concurrent, then the point (a, b) lies on a :- **[JEE (Main)-2014 (Online)]**

(1) circle (2) straight line

(3) parabola (4) hyperbola

22. The circumcentre of a triangle lies at the origin and its centroid is the mid point of the line segment joining the points $(a^2 + 1, a^2 + 1)$ and (2a, –2a), $a \neq 0$. Then for any a, the orthocentre of this triangle lies on the line : **[JEE (Main)-2014 (Online)]**

(1) $y - (a^2 + 1)x = 0$

(2) y + x = 0

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

(4) y – 2ax = 0

23. If a line L is perpendicular to the line 5x – y = 1, and the area of the triangle formed by the line L and the coordinate axes is 5, then the distance of line L from the line x + 5y = 0 is :- **[JEE (Main)-2014 (Online)]**

(1) $\frac{7}{\sqrt{5}}$ (2) $\frac{5}{\sqrt{13}}$

(3) $\frac{7}{\sqrt{13}}$ (4) $\frac{5}{\sqrt{7}}$

24. Locus of the image of the point (2, 3) in the line $(2x - 3y + 4) + k(x - 2y + 3) = 0$, $k \in R$, is a

(1) circle of radius $\sqrt{2}$ **[JEE(Main)-2015]**

(2) circle of radius $\sqrt{3}$

(3) straight line parallel to x-axis

(4) straight line parallel to y-axis

25. 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]**

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

(3) $(-3, -8)$ (4) $\left(\frac{1}{3}, -\frac{8}{3}\right)$

26. Let k be an integer such that 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]**

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

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

27. If P(1,2), Q(4,6) R(5,7) and S(a,b) are the vertices of a parallelogram PQRS, then- **[IIT-1998]**

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

(3) a = 2, b = 3 (4) a = 3, b = 5

28. Orthocentre of the triangle whose vertices are A(0,0), B(3,4) & C(4,0) is- **[IIT-2003]**

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

(3) (3,12) (4) (2,0)

29. 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 coordinates of R are- **[IIT-2007]**

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

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

30. A straight line L through the point $(3, -2)$ is inclined at an angle $60°$ to the line $\sqrt{3}x + y = 1$. If L also intersect the x-axis, then the equation of L is

(1) $y + \sqrt{3}x + 2 - 3\sqrt{3} = 0$ **[IIT-2011]**

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

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

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

PREVIOUS YEARS QUESTIONS	ANSWER KEY									Exercise-II
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**2**	**4**	**3**	**1**	**1**	**3**	**2**	**1**	**4**	**4**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**4**	**4**	**2**	**3**	**2**	**2**	**3**	**2**	**4**	**1**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**3**	**2**	**1**	**4**	**1**	**3**	**1**	**3**	**2**