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JEE MAIN STRAIGHT LINES — PYQS

Max. Marks: 136 **Questions:** 34

Section A (MCQ) — 28 questions

Q.1 If a straight line drawn through the point of intersection of the lines 4x + 3y–1 = 0 and 3x + 4y–1 = 0, meets the co-ordinate axes at the points P and Q, then the locus of the mid point of PQ is : [JEE Main 2026 (Online) 8th April Evening Shift]

(1) x + y–7 = 0 (2) x + y–14xy = 0

(3) 2x + y + 14xy = 0 (4) x + 2y–14xy = 0

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Q.2 In an equilateral triangle PQR, let the vertex P be at (3, 5) and the side QR be along the line x + y = 4. If the orthocentre of the triangle PQR is (α, β), then 9(α + β) is equal to: [JEE Main 2026 (Online) 5th April Morning Shift]

(1) 16 (2) 27 (3) 36 (4) 48

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Q.3 Let the line L_1:x + 3 = 0 intersect the lines L_2:x − y = 0 and L_3:3x + y = 0 at the points A and B, respectively. Let the bisector of the obtuse angle between the lines L_2 and L_3 intersect the line L_1 at the point C. Then BC^2:AC^2 is equal to: [JEE Main 2026 (Online) 4th April Morning Shift]

(1) 5:1 (2) 1:5 (3) 2:3 (4) 3:2

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Q.4 Let the vertex A of a triangle ABC be (1, 2), and the mid-point of the side AB be (5, − 1). If the centroid of this triangle is (3, 4) and its circumcenter is (α, β), then 21(α + β) is equal to : [JEE Main 2026 (Online) 4th April Morning Shift]

(1) 309 (2) 403 (3) 497 (4) 524

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Q.5 Let the mid points of the sides of a triangle ABC be $\left(\frac{5}{2}, 7\right)$, $\left(\frac{5}{2}, 3\right)$ and (4, 5). If its incentre is (h, k), then 3h + k is equal to : [JEE Main 2026 (Online) 2nd April Morning Shift]

(1) 11 (2) 12 (3) 13 (4) 14

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Q.6 Let ABC be an equilateral triangle with orthocenter at the origin and the side BC on the line $x + 2\sqrt{2}y = 4$. If the co-ordinates of the vertex A are (α, β), then the greatest integer less than or equal to $|\alpha + \sqrt{2}\beta|$ is [JEE Main 2026 (Online) 28th January Morning Shift]

(1) 5 (2) 4 (3) 2 (4) 3

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Q.7 Let A(1, 0), B(2, − 1) and $C\left(\frac{7}{3}, \frac{4}{3}\right)$ be three points. If the equation of the bisector of the angle ABC is αx + βy = 5, then the value of $\alpha^2 + \beta^2$ is [JEE Main 2026 (Online) 24th January Morning Shift]

(1) 5 (2) 10 (3) 8 (4) 13

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Q.8 Let the angles made with the positive x-axis by two straight lines drawn from the point P(2, 3) and meeting the line x + y = 6 at a distance $\sqrt{\frac{2}{3}}$ from the point P be θ_1 and θ_2. Then the value of $(\theta_1 + \theta_2)$ is: [JEE Main 2026 (Online) 24th January Evening Shift]

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{12}$ (4) $\frac{\pi}{6}$

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Q.9 A rectangle is formed by the lines x = 0, y = 0, x = 3 and y = 4. Let the line L be perpendicular to 3x + y + 6 = 0 and divide the area of the rectangle into two equal parts. Then the distance of the point $\left(\frac{1}{2}, -5\right)$ from the line L is equal to : [JEE Main 2026 (Online) 23rd January Morning Shift]

(1) $\sqrt{10}$ (2) $2\sqrt{5}$

(3) $2\sqrt{10}$ (4) $3\sqrt{10}$

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Q.10 Let A(1, 2) and C(−3, − 6) be two diagonally opposite vertices of a rhombus, whose sides AD and BC are parallel to the line 7x − y = 14. If B(α, β) and D(γ, δ) are the other two vertices, then |α + β + γ + δ| is equal to : [JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 3 (2) 6 (3) 1 (4) 9

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Q.11 Among the statements

(S1) : If A(5, − 1) and B(−2, 3) are two vertices of a triangle, whose orthocentre is (0, 0), then its third vertex is (−4, − 7)

and

(S2) : If positive numbers 2a, b, c are three consecutive terms of an A.P., then the lines ax + by + c = 0 are concurrent at (2, − 2),

[JEE Main 2026 (Online) 22nd January Evening Shift]

(1) both are incorrect (2) only (S2) is correct

(3) both are correct (4) only (S1) is correct

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Q.12 Let a point A lie between the parallel lines L_1 and L_2 such that its distances from L_1 and L_2 are 6 and 3 units, respectively. Then the area (in sq. units) of the equilateral triangle ABC, where the points B and C lie on the lines L_1 and L_2, respectively, is :

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $21\sqrt{3}$ (2) $12\sqrt{2}$

(3) $15\sqrt{6}$ (4) 27

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Q.13 Let a be the length of a side of a square OABC with O being the origin. Its side OA makes an acute angle α with the positive x-axis and the equations of its diagonals are $(\sqrt{3}+1)x+(\sqrt{3}-1)y=0$ and $(\sqrt{3}-1)x-(\sqrt{3}+1)y+8\sqrt{3}=0$. Then a^2 is equal to : [JEE Main 2025 (Online) 8th April Evening Shift]

(1) 48 (2) 16 (3) 24 (4) 32

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Q.14 A line passing through the point P(a, 0) makes an acute angle α with the positive x-axis. Let this line be rotated about the point P through an angle $\frac{\alpha}{2}$ in the clockwise direction. If in the new position, the slope of the line is $2-\sqrt{3}$ and its distance from the origin is $\frac{1}{\sqrt{2}}$, then the value of $3a^2\tan^2\alpha-2\sqrt{3}$ is : [JEE Main 2025 (Online) 8th April Evening Shift]

(1) 8 (2) 4 (3) 5 (4) 6

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Q.15 Let ABC be the triangle such that the equations of lines AB and AC be 3y − x = 2 and x + y = 2, respectively, and the points B and C lie on x-axis. If P is the orthocentre of the triangle ABC, then the area of the triangle PBC is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 8 (2) 4 (3) 10 (4) 6

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Q.16 If the orthocenter of the triangle formed by the lines y = x + 1, y = 4x − 8 and y = mx + c is at (3, − 1), then m − c is :

[JEE Main 2025 (Online) 7th April Evening Shift]

(1) 0 (2) 2 (3) −2 (4) 4

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Q.17 Let the three sides of a triangle lie on the lines 4x − 7y + 10 = 0, x + y = 5 and 7x + 4y = 15. Then the distance of its orthocentre from the orthocentre of the triangle formed by the lines x = 0, y = 0 and x + y = 1 is

[JEE Main 2025 (Online) 4th April Morning Shift]

(1) $\sqrt{20}$ (2) 20 (3) $\sqrt{5}$ (4) 5

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Q.18 A line passes through the origin and makes equal angles with the positive coordinate axes. It intersects the lines L_1:2x + y + 6 = 0 and L_2:4x + 2y − p = 0, p > 0, at the points A and B, respectively. If $AB=\frac{9}{\sqrt{2}}$ and the foot of the perpendicular from the point A on the line L_2 is M, then $\frac{AM}{BM}$ is equal to

[JEE Main 2025 (Online) 3rd April Morning Shift]

(1) 5 (2) 3 (3) 2 (4) 4

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Q.19 Consider the lines x(3λ + 1) + y(7λ + 2) = 17λ + 5, λ being a parameter, all passing through a point P. One of these lines (say L) is farthest from the origin. If the distance of L from the point (3, 6) is d, then the value of d^2 is

[JEE Main 2025 (Online) 3rd April Evening Shift]

(1) 10 (2) 20 (3) 15 (4) 30

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Q.20 Let the area of the triangle formed by a straight line L:x + by + c = 0 with co-ordinate axes be 48 square units. If the perpendicular drawn from the origin to the line L makes an angle of 45° with the positive x-axis, then the value of $b^2 + c^2$ is :

[JEE Main 2025 (Online) 2nd April Evening Shift]

(1) 90 (2) 83 (3) 93 (4) 97

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Q.21 Let ΔABC be a triangle formed by the lines 7x − 6y + 3 = 0, x + 2y − 31 = 0 and 9x − 2y − 19 = 0. Let the point (h, k) be the image of the centroid of ΔABC in the line 3x + 6y − 53 = 0. Then $h^2 + k^2 + hk$ is equal to :

[JEE Main 2025 (Online) 29th January Morning Shift]

(1) 47 (2) 37 (3) 40 (4) 36

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Q.22 Let the line x + y = 1 meet the axes of x and y at A and B, respectively. A right angled triangle AMN is inscribed in the triangle OAB, where O is the origin and the points M and N lie on the lines OB and AB, respectively. If the area of the triangle AMN is $\frac{4}{9}$ of the area of the triangle OAB and AN:NB = λ:1, then the sum of all possible value(s) of λ is:

[JEE Main 2025 (Online) 29th January Evening Shift]

(1) $\frac{1}{2}$ (2) $\frac{5}{2}$ (3) 2 (4) $\frac{13}{6}$

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Q.23 Two equal sides of an isosceles triangle are along −x + 2y = 4 and x + y = 4. If m is the slope of its third side, then the sum of all possible distinct values of m is:

[JEE Main 2025 (Online) 28th January Evening Shift]

(1) $-2\sqrt{10}$ (2) 12

(3) −6 (4) 6

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Q.24 Let the lines 3x–4y − α = 0, 8x–11y–33 = 0, and 2x–3y + λ = 0 be concurrent. If the image of the point (1,2) in the line 2x–3y + λ = 0 is $\left(\frac{57}{13}, \frac{-40}{13}\right)$, then |αλ| is equal to

[JEE Main 2025 (Online) 24th January Morning Shift]

(1) 91 (2) 113 (3) 101 (4) 84

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Q.25 Let the points $\left(\frac{11}{2}, \alpha\right)$ lie on or inside the triangle with sides x + y = 11, x + 2y = 16 and 2x + 3y = 29. Then the product of the smallest and the largest values of α is equal to :

[JEE Main 2025 (Online) 24th January Evening Shift]

(1) 22 (2) 33 (3) 55 (4) 44

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Q.26 Let the area of a △PQR with vertices P(5,4), Q(−2,4) and R(a,b) be 35 square units. If its orthocenter and centroid are $O\left(2, \frac{14}{5}\right)$ and C(c,d) respectively, then c + 2d is equal to

[JEE Main 2025 (Online) 23rd January Morning Shift]

(1) 3 (2) $\frac{7}{3}$ (3) 2 (4) $\frac{8}{3}$

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Q.27 A rod of length eight units moves such that its ends A and B always lie on the lines x − y + 2 = 0 and y + 2 = 0, respectively. If the locus of the point P, that divides the rod AB internally in the ratio 2:1 is $9(x^2 + \alpha y^2 + \beta xy + \gamma x + 28y) - 76 = 0$, then α − β − γ is equal to :

[JEE Main 2025 (Online) 23rd January Evening Shift]

(1) 24 (2) 22 (3) 21 (4) 23

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Q.28 Let the triangle PQR be the image of the triangle with vertices (1,3),(3,1) and (2,4) in the line x + 2y = 2. If the centroid of △PQR is the point (α, β), then 15(α − β) is equal to :

[JEE Main 2025 (Online) 22nd January Morning Shift]

(1) 21 (2) 19 (3) 22 (4) 24

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Section B (Numerical) — 6 questions

Q.29 From the point (−1, − 1), two rays are sent making angles of 45° with the line x + y = 0. These rays get reflected from the mirror x + 2y = 1. If the equations of the reflected rays are ax + by = 9 and cx + dy = 7, $a, b, c, d \in Z$, then the value of ad + bc is _____.

[JEE Main 2026 (Online) 5th April Evening Shift]

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Q.30 Let A, B be points on the two half-lines $x-\sqrt{3}|y|=\alpha$, $\alpha>0$ at a distance of α from their point of intersection P. The line segment AB meets the angle bisector of the given half-lines at the point Q. If $PQ=\frac{9}{2}$ and R is the radius of the circumcircle of $\triangle$ PAB, then $\frac{\alpha^2}{R}$ is equal to _____.

[JEE Main 2026 (Online) 4th April Evening Shift]

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Q.31 If P is a point on the circle $x^2 + y^2 = 4$, Q is a point on the straight line $5x + y + 2 = 0$ and $x - y + 1 = 0$ is the perpendicular bisector of PQ, then 13 times the sum of abscissa of all such points P is _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

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Q.32 Let A(4, − 2), B(1, 1) and C(9, − 3) be the vertices of a triangle ABC. Then the maximum area of the parallelogram AFDE, formed with vertices D, E and F on the sides BC, CA and AB of the triangle ABC respectively, is _____.

[JEE Main 2025 (Online) 2nd April Evening Shift]

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Q.33 Let A(6,8), $B(10\cos\alpha, -10\sin\alpha)$ and $C(-10\sin\alpha, 10\cos\alpha)$, be the vertices of a triangle. If L(a,9) and G(h,k) be its orthocenter and centroid respectively, then $(5a-3h+6k+100\sin 2\alpha)$ is equal to _____.

[JEE Main 2025 (Online) 22nd January Evening Shift]

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Q.34 Let the distance between two parallel lines be 5 units and a point P lie between the lines at a unit distance from one of them. An equilateral triangle PQR is formed such that Q lies on one of the parallel lines, while R lies on the other. Then $(QR)^2$ is equal to _____.

[JEE Main 2025 (Online) 22nd January Evening Shift]

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ANSWER KEY

Section A (MCQ) — 28 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**2**	**4**	**1**	**3**	**3**	**2**	**2**	**1**	**3**	**2**	**3**
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	**1**	**1**	**2**	**4**	**1**	**3**	**2**	**2**	**4**	**2**	**3**
Ques.	23	24	25	26	27	28					
Ans.	**4**	**1**	**2**	**1**	**4**	**3**					

Section B (Numerical) — 6 questions

Ques.	29	30	31	32	33	34	
Ans.	**7**	**9**	**2**	**3**	**145**	**28**	