

JEE MAIN THREE DIMENSIONAL GEOMETRY — PYQS

Max. Marks: 212

Questions: 53

Section A (MCQ) — 47 questions

Q.1 Let the foot of perpendicular from the point $(\lambda, 2, 3)$ on the line $\frac{x-4}{1} = \frac{y-9}{2} = \frac{z-5}{1}$ be the point $(1, \mu, 2)$.

Then the distance between the lines

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+4}{6} \text{ and } \frac{x-\lambda}{2} = \frac{y-\mu}{3} = \frac{z+5}{6} \text{ is equal}$$

to : [JEE Main 2026 (Online) 8th April Evening Shift]

(1) $\frac{12}{7}$ (2) $\frac{\sqrt{145}}{7}$ (3) $\frac{\sqrt{146}}{7}$ (4) $\frac{\sqrt{143}}{7}$

Scan or tap for the full solution 

Q.2 Let the image of the point $P(1, 6, a)$ in the line $L: \frac{x}{1} = \frac{y-1}{2} = \frac{z-a+1}{b}$, $b > 0$, be $(\frac{a}{3}, 0, a+c)$. If $S(\alpha, \beta, \gamma)$, $\alpha > 0$, is the point on L such that the distance of S from the foot of perpendicular from the point P on L is $2\sqrt{14}$, then $\alpha + \beta + \gamma$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

(1) 19 (2) 20 (3) 21 (4) 22

Scan or tap for the full solution 

Q.3 Let a line L be perpendicular to both the lines $L_1: \frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ and $L_2: \frac{x-2}{1} = \frac{y-4}{4} = \frac{z-6}{7}$. If θ is the acute angle

between the lines L and $L_3: \frac{x-\frac{8}{7}}{2} = \frac{y-\frac{4}{7}}{1} = \frac{z}{2}$, then

$\tan \theta$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

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

Scan or tap for the full solution 

Q.4 The shortest distance between the lines $\frac{x-4}{1} = \frac{y-3}{2} = \frac{z-2}{-3}$ and $\frac{x+2}{2} = \frac{y-6}{4} = \frac{z-5}{-5}$ is :

[JEE Main 2026 (Online) 6th April Evening Shift]

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

Scan or tap for the full solution 

Q.5 The square of the distance of the point $P(5, 6, 7)$ from the line $\frac{x-2}{2} = \frac{y-5}{3} = \frac{z-2}{4}$ is equal to:

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

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

Scan or tap for the full solution 

Q.6 The square of the distance of the point of intersection of the lines $\vec{r} = (\hat{i} + \hat{j} - \hat{k}) + \lambda(\hat{a}\hat{i} - \hat{j})$, $\hat{a} \neq 0$ and $\vec{r} = (4\hat{i} - \hat{k}) + \mu(2\hat{i} + \hat{a}\hat{k})$ from the origin is :

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

(1) 5 (2) 10 (3) 17 (4) 26

Scan or tap for the full solution 

Q.7 Let a triangle PQR be such that P and Q lie on the line $\frac{x+3}{8} = \frac{y-4}{2} = \frac{z+1}{2}$ and are at a distance of 6 units from $R(1, 2, 3)$. If (α, β, γ) is the centroid of ΔPQR , then $\alpha + \beta + \gamma$ is equal to :

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

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

Scan or tap for the full solution 

Q.8 If the distance of the point $(a, 2, 5)$ from the image of the point $(1, 2, 7)$ in the line $\frac{x}{1} = \frac{y-1}{1} = \frac{z-2}{2}$ is 4, then the sum of all possible values of a is equal to :

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

(1) 11 (2) 9 (3) 6 (4) 4

Scan or tap for the full solution 

Q.9 A line with direction ratios 1, -1, 2 intersects the lines $\frac{x}{2} = \frac{y}{3} = \frac{z+1}{3}$ and $\frac{x+1}{-1} = \frac{y-2}{1} = \frac{z}{4}$ at the points P and Q , respectively. If the length of the line segment PQ is α , then $225\alpha^2$ is equal to:

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

- (1) 1024 (2) 1014 (3) 1104 (4) 1204

Scan or tap for the full solution 

Q.10 The square of the distance of the point $(-2, -8, 6)$ from the line $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z}{-1}$ along the line $\frac{x+5}{1} = \frac{y+5}{-1} = \frac{z}{2}$ is equal to:

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

- (1) 3 (2) 6 (3) 8 (4) 12

Scan or tap for the full solution 

Q.11 The shortest distance between the lines

$$\vec{r} = \left(\frac{1}{3}\hat{i} + 2\hat{j} + \frac{8}{3}\hat{k}\right) + \lambda(2\hat{i} - 5\hat{j} + 6\hat{k})$$

$$\text{and } \vec{r} = \left(-\frac{2}{3}\hat{i} - \frac{1}{3}\hat{k}\right) + \mu(\hat{j} - \hat{k}), \lambda, \mu \in \mathbb{R}, \text{ is :}$$

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

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

Scan or tap for the full solution 

Q.12 If $\left(2\alpha + 1, \alpha^2 - 3\alpha, \frac{\alpha - 1}{2}\right)$ is the image of $(\alpha, 2\alpha, 1)$ in the line $\frac{x-2}{3} = \frac{y-1}{2} = \frac{z}{1}$, then the possible value(s) of α is (are)

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

- (1) Only 3 (2) Only 3 and -1
(3) Only 3, $\frac{1}{4}$ and -1 (4) Only 3 and $\frac{1}{4}$

Scan or tap for the full solution 

Q.13 If the point of intersection of the lines $\frac{x+1}{3} = \frac{y+a}{5} = \frac{z+b+1}{7}$ and $\frac{x-2}{1} = \frac{y-b}{4} = \frac{z-2a}{7}$ lies on xy-plane, then the value of $a + b$ is :

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) 2 (2) 5 (3) 7 (4) 9

Scan or tap for the full solution 

Q.14 Let a line L passing through the point $(1, 1, 1)$ be perpendicular to both the vectors $2\hat{i} + 2\hat{j} + \hat{k}$ and $\hat{i} + 2\hat{j} + 2\hat{k}$. If P(a, b, c) is the foot of perpendicular from the origin on the line L, then the value of $34(a + b + c)$ is :

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) 50 (2) 80 (3) 100 (4) 120

Scan or tap for the full solution 

Q.15 Let the point A be the foot of perpendicular drawn from the point P(a, b, 0) on the line

$$\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-\alpha}{3}.$$

If the midpoint of the line segment PA is $\left(0, \frac{3}{4}, -\frac{1}{4}\right)$, then the value of $a^2 + b^2 + \alpha^2$ is equal to :

[JEE Main 2026 (Online) 2nd April Evening Shift]

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

Scan or tap for the full solution 

Q.16 If the distances of the point $(1, 2, a)$ from the line $\frac{x-1}{1} = \frac{y}{2} = \frac{z-1}{1}$ along the lines

$$L_1 : \frac{x-1}{3} = \frac{y-2}{4} = \frac{z-a}{b} \text{ and } L_2 : \frac{x-1}{1} = \frac{y-2}{4} = \frac{z-a}{c}$$

are equal, then $a + b + c$ is equal to

[JEE Main 2026 (Online) 28th January Morning Shift]

- (1) 4 (2) 6 (3) 7 (4) 5

Scan or tap for the full solution 

Q.17 Let Q(a, b, c) be the image of the point P(3, 2, 1) in the line $\frac{x-1}{1} = \frac{y}{2} = \frac{z-1}{1}$. Then the distance of Q from the line $\frac{x-9}{3} = \frac{y-9}{2} = \frac{z-5}{-2}$ is

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) 8 (2) 7 (3) 6 (4) 5

Scan or tap for the full solution 

Q.18 Let the lines

$$L_1 : \vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k}), \lambda \in \mathbb{R} \text{ and}$$

$$L_2 : \vec{r} = (4\hat{i} + \hat{j}) + \mu(5\hat{i} + 2\hat{j} + \hat{k}), \mu \in \mathbb{R}, \text{ intersect at the point R. Let P and Q be the points lying on lines } L_1 \text{ and } L_2, \text{ respectively, such that } |\vec{PR}| = \sqrt{29} \text{ and}$$

$$|\vec{PQ}| = \sqrt{\frac{47}{3}}. \text{ If the point P lies in the first octant, then } 27(QR)^2 \text{ is equal to}$$

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) 360 (2) 348 (3) 320 (4) 340

Scan or tap for the full solution 

Q.19 The sum of all values of α , for which the shortest distance between the lines $\frac{x+1}{\alpha} = \frac{y-2}{-1} = \frac{z-4}{-\alpha}$ and

$$\frac{x}{\alpha} = \frac{y-1}{2} = \frac{z-1}{2\alpha} \text{ is } \sqrt{2}, \text{ is}$$

[JEE Main 2026 (Online) 24th January Evening Shift]

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

Scan or tap for the full solution 

- Q.20** Let the direction cosines of two lines satisfy the equations : $4l + m - n = 0$ and $2mn + 10nl + 3lm = 0$. Then the cosine of the acute angle between these lines is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

(1) $\frac{10}{7\sqrt{38}}$ (2) $\frac{10}{\sqrt{38}}$ (3) $\frac{10}{3\sqrt{38}}$ (4) $\frac{20}{3\sqrt{38}}$

Scan or tap for the full solution



- Q.21** The vertices B and C of a triangle ABC lie on the line $\frac{x}{1} = \frac{1-y}{-2} = \frac{z-2}{3}$. The coordinates of A and B are (1, 6, 3) and (4, 9, α) respectively and C is at a distance of 10 units from B. The area (in sq. units) of $\triangle ABC$ is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

(1) $20\sqrt{13}$ (2) $5\sqrt{13}$
(3) $15\sqrt{13}$ (4) $10\sqrt{13}$

Scan or tap for the full solution



- Q.22** Let $P(\alpha, \beta, \gamma)$ be the point on the line $\frac{x-1}{2} = \frac{y+1}{-3} = z$ at a distance $4\sqrt{14}$ from the point (1, -1, 0) and nearer to the origin. Then the shortest distance, between the lines $\frac{x-\alpha}{1} = \frac{y-\beta}{2} = \frac{z-\gamma}{3}$ and $\frac{x+5}{2} = \frac{y-10}{1} = \frac{z-3}{1}$, is equal to

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

(1) $4\sqrt{\frac{7}{5}}$ (2) $7\sqrt{\frac{5}{4}}$ (3) $4\sqrt{\frac{5}{7}}$ (4) $2\sqrt{\frac{7}{4}}$

Scan or tap for the full solution



- Q.23** If the image of the point $P(1, 2, a)$ in the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{7-z}{2}$ is $Q(5, b, c)$, then $a^2 + b^2 + c^2$ is equal to

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

(1) 298 (2) 264 (3) 293 (4) 283

Scan or tap for the full solution



- Q.24** Let L be the line $\frac{x+1}{2} = \frac{y+1}{3} = \frac{z+3}{6}$ and let S be the set of all points (a, b, c) on L, whose distance from the line $\frac{x+1}{2} = \frac{y+1}{3} = \frac{z-9}{0}$ along the line L is 7. Then $\sum_{(a, b, c) \in S} (a+b+c)$ is equal to :

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

- (1) 28 (2) 6 (3) 40 (4) 34

Scan or tap for the full solution



- Q.25** Let (α, β, γ) be the co-ordinates of the foot of the perpendicular drawn from the point (5, 4, 2) on the line $\vec{r} = (-\hat{i} + 3\hat{j} + \hat{k}) + \lambda(2\hat{i} + 3\hat{j} - \hat{k})$.

Then the length of the projection of the vector $\alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$ on the vector $6\hat{i} + 2\hat{j} + 3\hat{k}$ is :

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

(1) $\frac{18}{7}$ (2) $\frac{15}{7}$ (3) 4 (4) 3

Scan or tap for the full solution



- Q.26** Let the line L pass through the point (-3, 5, 2) and make equal angles with the positive coordinate axes. If the distance of L from the point (-2, r, 1) is $\sqrt{\frac{14}{3}}$, then the sum of all possible values of r is :

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

(1) 16 (2) 12 (3) 6 (4) 10

Scan or tap for the full solution



- Q.27** Let the line L_1 be parallel to the vector $-3\hat{i} + 2\hat{j} + 4\hat{k}$ and pass through the point (2, 6, 7), and the line L_2 be parallel to the vector $2\hat{i} + \hat{j} + 3\hat{k}$ and pass through the point (4, 3, 5). If the line L_3 is parallel to the vector $-3\hat{i} + 5\hat{j} + 16\hat{k}$ and intersects the lines L_1 and L_2 at the points C and D, respectively, then $|\vec{CD}|^2$ is equal to:

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

(1) 290 (2) 171 (3) 89 (4) 312

Scan or tap for the full solution



- Q.28** Let the values of λ for which the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-\lambda}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ is $\frac{1}{\sqrt{6}}$ be λ_1 and λ_2 . Then the radius of the circle passing through the points (0, 0), (λ_1, λ_2) and (λ_2, λ_1) is

[JEE Main 2025 (Online) 8th April Evening Shift]

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

Scan or tap for the full solution



- Q.29** Let the line L pass through (1, 1, 1) and intersect the lines $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{y-4}{2} = \frac{z}{1}$. Then, which of the following points lies on the line L?

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

- (1) (7, 15, 13) (2) (4, 22, 7)
(3) (10, -29, -50) (4) (5, 4, 3)

Scan or tap for the full solution



Q.30 If the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x}{1} = \frac{y}{\alpha} = \frac{z-5}{1}$ is $\frac{5}{\sqrt{6}}$, then the sum of all possible values of α is

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

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

Scan or tap for the full solution



Q.31 If the equation of the line passing through the point $(0, -\frac{1}{2}, 0)$ and perpendicular to the lines $\vec{r} = \lambda(\hat{i} + \hat{a}\hat{j} + b\hat{k})$ and

$$\vec{r} = (\hat{i} - \hat{j} - 6\hat{k}) + \mu(-b\hat{i} + \hat{a}\hat{j} + 5\hat{k})$$

$$\frac{x-1}{-2} = \frac{y+4}{d} = \frac{z-c}{-4}, \text{ then } a + b + c + d \text{ is equal to :}$$

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

- (1) 13 (2) 14 (3) 12 (4) 10

Scan or tap for the full solution



Q.32 Consider the lines $L_1: x - 1 = y - 2 = z$ and $L_2: x - 2 = y = z - 1$. Let the feet of the perpendiculars from the point $P(5, 1, -3)$ on the lines L_1 and L_2 be Q and R respectively. If the area of the triangle PQR is A, then $4A^2$ is equal to :

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

- (1) 151 (2) 147 (3) 139 (4) 143

Scan or tap for the full solution



Q.33 Let the shortest distance between the lines $\frac{x-3}{3} = \frac{y-\alpha}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-\beta}{4}$ be $3\sqrt{30}$. Then the positive value of $5\alpha + \beta$ is

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

- (1) 42 (2) 40 (3) 48 (4) 46

Scan or tap for the full solution



Q.34 Let A and B be two distinct points on the line $L: \frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}$. Both A and B are at a distance $2\sqrt{17}$ from the foot of perpendicular drawn from the point (1, 2, 3) on the line L. If O is the origin, then $\vec{OA} \cdot \vec{OB}$ is equal to

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

- (1) 49 (2) 21 (3) 47 (4) 62

Scan or tap for the full solution



Q.35 Let A be the point of intersection of the lines $L_1: \frac{x-7}{1} = \frac{y-5}{0} = \frac{z-3}{-1}$ and $L_2: \frac{x-1}{3} = \frac{y+3}{4} = \frac{z+7}{5}$. Let B and C be the points on the lines L_1 and L_2 respectively such that $AB = AC = \sqrt{15}$. Then the square of the area of the triangle ABC is :

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

- (1) 63 (2) 57 (3) 60 (4) 54

Scan or tap for the full solution



Q.36 Let the values of p, for which the shortest distance between the lines $\frac{x+1}{3} = \frac{y}{4} = \frac{z}{5}$ and $\vec{r} = (p\hat{i} + 2\hat{j} + \hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$ is $\frac{1}{\sqrt{6}}$, be a, b, (a < b). Then the length of the latus rectum of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is :

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

- (1) $\frac{3}{2}$ (2) 9 (3) 18 (4) $\frac{2}{3}$

Scan or tap for the full solution



Q.37 Let a line passing through the point (4, 1, 0) intersect the line $L_1: \frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ at the point $A(\alpha, \beta, \gamma)$ and the line $L_2: x - 6 = y = -z + 4$ at the point B(a, b, c). Then $\begin{vmatrix} 1 & 0 & 1 \\ \alpha & \beta & \gamma \\ a & b & c \end{vmatrix}$ is equal to

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

- (1) 16 (2) 6 (3) 8 (4) 12

Scan or tap for the full solution



Q.38 Line L_1 passes through the point (1, 2, 3) and is parallel to z-axis. Line L_2 passes through the point $(\lambda, 5, 6)$ and is parallel to y-axis. Let for $\lambda = \lambda_1, \lambda_2$, $\lambda_2 < \lambda_1$, the shortest distance between the two lines be 3. Then the square of the distance of the point $(\lambda_1, \lambda_2, 7)$ from the line L_1 is

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

- (1) 25 (2) 32 (3) 40 (4) 37

Scan or tap for the full solution



Q.39 Each of the angles β and γ that a given line makes with the positive y- and z-axes, respectively, is half of the angle that this line makes with the positive x-axis. Then the sum of all possible values of the angle β is

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

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

Scan or tap for the full solution



Q.40 The distance of the point (7, 10, 11) from the line

$$\frac{x-4}{1} = \frac{y-4}{0} = \frac{z-2}{3} \text{ along the line}$$

$$\frac{x-9}{2} = \frac{y-13}{3} = \frac{z-17}{6} \text{ is}$$

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

- (1) 16 (2) 12 (3) 18 (4) 14

Scan or tap for the full solution



Q.41 Let the vertices Q and R of the triangle PQR lie on the line $\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3}$, $QR = 5$ and the coordinates of the point P be (0, 2, 3). If the area of the triangle PQR is $\frac{m}{n}$ then :

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

- (1) $2m - 5\sqrt{21}n = 0$ (2) $m - 5\sqrt{21}n = 0$
(3) $5m - 21\sqrt{2}n = 0$ (4) $5m - 2\sqrt{21}n = 0$

Scan or tap for the full solution



Q.42 If the image of the point P(1, 0, 3) in the line joining the points A(4, 7, 1) and B(3, 5, 3) is Q(α , β , γ), then $\alpha + \beta + \gamma$ is equal to :

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

- (1) $\frac{46}{3}$ (2) 18 (3) 13 (4) $\frac{47}{3}$

Scan or tap for the full solution



Q.43 The line L_1 is parallel to the vector $\vec{a} = -3\hat{i} + 2\hat{j} + 4\hat{k}$ and passes through the point (7, 6, 2) and the line L_2 is parallel to the vector $\vec{b} = 2\hat{i} + \hat{j} + 3\hat{k}$ and passes through the point (5, 3, 4). The shortest distance between the lines L_1 and L_2 is :

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

- (1) $\frac{23}{\sqrt{38}}$ (2) $\frac{21}{\sqrt{38}}$ (3) $\frac{23}{\sqrt{57}}$ (4) $\frac{21}{\sqrt{57}}$

Scan or tap for the full solution



Q.44 Let $L_1 : \frac{x-1}{1} = \frac{y-2}{-1} = \frac{z-1}{2}$ and

$$L_2 : \frac{x+1}{-1} = \frac{y-2}{2} = \frac{z}{1} \text{ be two lines.}$$

Let L_3 be a line passing through the point (α , β , γ) and be perpendicular to both L_1 and L_2 . If L_3 intersects L_1 , then $|5\alpha - 11\beta - 8\gamma|$ equals :

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

- (1) 25 (2) 20 (3) 16 (4) 18

Scan or tap for the full solution



Q.45 Let $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + 7\hat{j} + 3\hat{k}$. Let

$$L_1 : \vec{r} = (-\hat{i} + 2\hat{j} + \hat{k}) + \lambda\vec{a}, \lambda \in \mathbf{R} \text{ and}$$

$L_2 : \vec{r} = (\hat{j} + \hat{k}) + \mu\vec{b}, \mu \in \mathbf{R}$ be two lines. If the line L_3 passes through the point of intersection of L_1 and L_2 and is parallel to $\vec{a} + \vec{b}$, then L_3 passes through the point :

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

- (1) (-1, -1, 1) (2) (2, 8, 5)
(3) (8, 26, 12) (4) (5, 17, 4)

Scan or tap for the full solution



Q.46 If the image of the point (4, 4, 3) in the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-1}{3}$ is (α , β , γ), then $\alpha + \beta + \gamma$ is equal to

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

- (1) 12 (2) 9 (3) 7 (4) 8

Scan or tap for the full solution



Q.47 The square of the distance of the point $\left(\frac{15}{7}, \frac{32}{7}, 7\right)$ from the line $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ in the direction of the vector $\hat{i} + 4\hat{j} + 7\hat{k}$ is:

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

- (1) 66 (2) 54 (3) 41 (4) 44

Scan or tap for the full solution



Section B (Numerical) — 6 questions

Q.48 Let a line L_1 pass through the origin and be perpendicular to the lines

$$L_2 : \vec{r} = (3+t)\hat{i} + (2t-1)\hat{j} + (2t+4)\hat{k} \text{ and}$$

$$L_3 : \vec{r} = (3+2s)\hat{i} + (3+2s)\hat{j} + (2+s)\hat{k}, t, s \in \mathbf{R}.$$

If (a , b , c), $a \in \mathbf{Z}$, is the point on L_3 at a distance of $\sqrt{17}$ from the point of intersection of L_1 and L_2 , then $(a+b+c)^2$ is equal to _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

Scan or tap for the full solution



- Q.49** Let the image of the point $P(0, -5, 0)$ in the line $\frac{x-1}{2} = \frac{y}{1} = \frac{z+1}{-2}$ be the point R and the image of the point $Q\left(0, -\frac{1}{2}, 0\right)$ in the line $\frac{x-1}{-1} = \frac{y+9}{4} = \frac{z+1}{1}$ be the point S . Then the square of the area of the parallelogram $PQRS$ is _____.

[JEE Main 2026 (Online) 6th April Evening Shift]

Scan or tap for the full solution



- Q.50** If the distance of the point $P(43, \alpha, \beta)$, $\beta < 0$, from the line $\vec{r} = 4\hat{i} - \hat{k} + \mu(2\hat{i} + 3\hat{k})$, $\mu \in \mathbb{R}$ along a line with direction ratios $3, -1, 0$ is $13\sqrt{10}$, then $\alpha^2 + \beta^2$ is equal to _____.

[JEE Main 2026 (Online) 28th January Evening Shift]

Scan or tap for the full solution



- Q.51** Let a line L passing through the point $P(1, 1, 1)$ be perpendicular to the lines $\frac{x-4}{4} = \frac{y-1}{1} = \frac{z-1}{1}$ and $\frac{x-17}{1} = \frac{y-71}{1} = \frac{z}{0}$. Let the line L intersect the yz -plane at the point Q . Another line parallel to L and passing through the point $S(1, 0, -1)$ intersects the yz -plane at the point R . Then the square of the area of the parallelogram $PQRS$ is equal to _____.

[JEE Main 2026 (Online) 24th January Morning Shift]

Scan or tap for the full solution



- Q.52** If the image of the point $P(a, 2, a)$ in the line $\frac{x}{2} = \frac{y+a}{1} = \frac{z}{1}$ is Q and the image of Q in the line $\frac{x-2b}{2} = \frac{y-a}{1} = \frac{z+2b}{-5}$ is P , then $a + b$ is equal to _____.

[JEE Main 2026 (Online) 23rd January Evening Shift]

Scan or tap for the full solution



- Q.53** Let the area of the triangle formed by the lines $x+2 = y-1 = z$, $\frac{x-3}{5} = \frac{y}{-1} = \frac{z-1}{1}$ and $\frac{x}{-3} = \frac{y-3}{3} = \frac{z-2}{1}$ be A . Then A^2 is equal to _____.

[JEE Main 2025 (Online) 8th April Evening Shift]

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 47 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	3	3	2	3	3	3	3	3	2	2	2
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	3	3	1	3	2	1	1	3	2	1
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	1	4	1	4	1	2	1	3	2	2	4
Ques.	34	35	36	37	38	39	40	41	42	43	44
Ans.	3	4	4	3	1	3	4	1	1	1	1
Ques.	45	46	47								
Ans.	3	2	1								

Section B (Numerical) — 6 questions

Ques.	48	49	50	51	52	53	
Ans.	4	162	170	6	3	56	