

PYQSide

JEE MAIN THREE DIMENSIONAL GEOMETRY — DISTANCE OF A POINT FROM A LINE, FOOT OF PERPENDICULAR — PYQS

Max. Marks: 88

Questions: 22

Section A (MCQ)

- Q.1** 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.2** 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.3** 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

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- Q.4** 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

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- Q.5** 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

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- Q.6** If $(2\alpha+1, \alpha^2-3\alpha, \frac{\alpha-1}{2})$ 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 $\frac{1}{4}$

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- Q.7** 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.8** 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 $(0, \frac{3}{4}, -\frac{1}{4})$, 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

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- Q.9** 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

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- Q.10** 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.11** If the image of the point P(1, 2, a) in the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-2}{2}$ 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

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- Q.12** 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

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- Q.13** 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

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- Q.14** 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

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- Q.15** 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

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- Q.16** The distance of the point (7, 10, 11) from the line $\frac{x-4}{1} = \frac{y-4}{0} = \frac{z-2}{3}$ along the line $\frac{x-9}{2} = \frac{y-13}{3} = \frac{z-17}{6}$ is

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

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

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- Q.17** 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.18** 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) $\frac{47}{3}$

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- Q.19** 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.20** 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

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Section B (Numerical)

- Q.21** 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]

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- Q.22** 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]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	3	3	3	3	2	1	3	1	2	2	1
Ques.	12	13	14	15	16	17	18	19	20		
Ans.	1	4	2	3	4	1	1	2	1		

Section B (Numerical)

Ques.	21	22					
Ans.	162	3					