

PART 1 - MATHEMATICS

Topic : Three dimensional geometry

SECTION-A : (Maximum Marks : 24)

This section contains **SIX** questions.

Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).

For each question, choose the option(s) corresponding to (all) the correct answer(s).

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -1 In all other cases.

For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

1. Let P be the plane such that it contains the straight line $\frac{x-1}{2} = \frac{y-3}{3} = \frac{z+2}{1}$ and is perpendicular to the plane $x + 2y + 3z = 4$. Let P_1 be the plane which passes through the point (4, 2, 2) and is parallel to P.

Then which of the following statements is (are) TRUE ?

[JEE Advanced 2026 Paper 1]

(A) The equation of the plane P is $7x - 5y + z = -10$

(B) The distance between the planes P and P_1 is 30

(C) The distance of the plane P from the origin is $2\sqrt{3}$

(D) The acute angle between the plane P and the plane $2x + 2y + z = 3$ is $\cos^{-1}\left(\frac{1}{3\sqrt{3}}\right)$

Scan or tap for the full solution



Space for Rough Work

2. Let L be the straight line joining the points $P(1, 2, -1)$ and $Q(2, 3, 1)$. Let S be the foot of the perpendicular drawn from the point $R(4, -1, 5)$ to the line L . Another line passing through R intersects L at a point T such that the point S divides the line segment PT internally in the ratio $|PS| : |ST| = 1 : 2$, where $|PS|$ and $|ST|$ are the lengths of the line segments PS and ST , respectively.

Then which of the following statements is (are) TRUE ?

[JEE Advanced 2026 Paper 2]

- (A) The orthocentre of the triangle PRT is $\left(\frac{23}{5}, -4, \frac{31}{5}\right)$
 (B) The orthocentre of the triangle PRT is $(4, 3, 5)$
 (C) The area of the triangle PRT is $6\sqrt{5}$
 (D) The area of the triangle PRT is $18\sqrt{5}$

Scan or tap for the full solution



3. Let L_1 be the line of intersection of the planes given by the equations

$$2x + 3y + z = 4 \text{ and } x + 2y + z = 5.$$

Let L_2 be the line passing through the point $P(2, -1, 3)$ and parallel to L_1 . Let M denote the plane given by the equation

$$2x + y - 2z = 6.$$

Suppose that the line L_2 meets the plane M at the point Q . Let R be the foot of the perpendicular drawn from P to the plane M .

Then which of the following statements is (are) TRUE?

[JEE Advanced 2025 Paper 1]

- (A) The length of the line segment PQ is $9\sqrt{3}$
 (B) The length of the line segment QR is 15
 (C) The area of ΔPQR is $\frac{3}{2}\sqrt{234}$
 (D) The acute angle between the line segments PQ and PR is $\cos^{-1}\left(\frac{1}{2\sqrt{3}}\right)$

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4. Let R^3 denote the three-dimensional space. Take two points $P = (1, 2, 3)$ and $Q = (4, 2, 7)$. Let $\text{dist}(X, Y)$ denote the distance between two points X and Y in R^3 . Let

$$S = \{X \in R^3 : (\text{dist}(X, P))^2 - (\text{dist}(X, Q))^2 = 50\} \text{ and}$$

$$T = \{Y \in R^3 : (\text{dist}(Y, Q))^2 - (\text{dist}(Y, P))^2 = 50\}.$$

Then which of the following statements is (are) TRUE?

[JEE Advanced 2024 Paper 1]

Space for Rough Work

- (A) There is a triangle whose area is 1 and all of whose vertices are from S.
 (B) There are two distinct points L and M in T such that each point on the line segment LM is also in T.
 (C) There are infinitely many rectangles of perimeter 48, two of whose vertices are from S and the other two vertices are from T.
 (D) There is a square of perimeter 48, two of whose vertices are from S and the other two vertices are from T.

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5. Let $\gamma \in \mathbb{R}$ be such that the lines $L_1: \frac{x+11}{1} = \frac{y+21}{2} = \frac{z+29}{3}$ and $L_2: \frac{x+16}{3} = \frac{y+11}{2} = \frac{z+4}{\gamma}$ intersect. Let R_1 be the point of intersection of L_1 and L_2 . Let $O = (0,0,0)$, and $\hat{n}$ denote a unit normal vector to the plane containing both the lines L_1 and L_2 .

Match each entry in **List-I** to the correct entry in **List-II**.

[JEE Advanced 2024 Paper 1]

List-I		List-II	
P.	γ equals	1.	$-\hat{i} - \hat{j} + \hat{k}$
Q.	A possible choice for $\hat{n}$ is	2.	$\sqrt{\frac{3}{2}}$
R.	$\vec{OR}_1$ equals	3.	1
S.	A possible value of $\vec{OR}_1 \cdot \hat{n}$ is	4.	$\frac{1}{\sqrt{6}}\hat{i} - \frac{2}{\sqrt{6}}\hat{j} + \frac{1}{\sqrt{6}}\hat{k}$
		5.	$\sqrt{\frac{2}{3}}$

- (A) (P) $\rightarrow$ (3) (Q) $\rightarrow$ (4) (R) $\rightarrow$ (1) (S) $\rightarrow$ (2) (B) (P) $\rightarrow$ (5) (Q) $\rightarrow$ (4) (R) $\rightarrow$ (1) (S) $\rightarrow$ (2)
 (C) (P) $\rightarrow$ (3) (Q) $\rightarrow$ (4) (R) $\rightarrow$ (1) (S) $\rightarrow$ (5) (D) (P) $\rightarrow$ (3) (Q) $\rightarrow$ (1) (R) $\rightarrow$ (4) (S) $\rightarrow$ (5)

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6. A straight line drawn from the point $P(1,3,2)$, parallel to the line $\frac{x-2}{1} = \frac{y-4}{2} = \frac{z-6}{1}$, intersects the plane $L_1: x - y + 3z = 6$ at the point Q. Another straight line which passes through Q and is perpendicular to the plane L_1 intersects the plane $L_2: 2x - y + z = -4$ at the point R. Then which of the following statements is (are) TRUE?

[JEE Advanced 2024 Paper 2]

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- (A) The length of the line segment PQ is $\sqrt{6}$
- (B) The coordinates of R are (1,6,3)
- (C) The centroid of the triangle PQR is $\left(\frac{4}{3}, \frac{14}{3}, \frac{5}{3}\right)$
- (D) The perimeter of the triangle PQR is $\sqrt{2} + \sqrt{6} + \sqrt{11}$

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full solution



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JEE ADVANCED THREE DIMENSIONAL GEOMETRY — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A

Ques.	1	2	3	4	5	6						
Ans.	A, D	A, D	A, C	A, B, C, D	C	A, C						