

PART 1 - MATHEMATICS

Topic : Vector algebra

SECTION-A : (Maximum Marks : 8)

- This section contains **TWO** questions.
- Each question has **TWO** lists: **List-I** and **List-II**.
- Four options are given representing matching of elements from List-I and List-II. **ONLY ONE** of these four options corresponds to a correct matching.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct option is chosen;

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

Negative Marks : -1 In all other cases.

1. Let $\vec{a}$, $\vec{b}$ be two vectors, and let P, Q and R be the points with position vectors $\vec{a}$, $\vec{b}$ and $\vec{a} + \vec{b}$, respectively, with respect to the origin O. If $|\vec{a} + \vec{b}| = \sqrt{21}$, $|\vec{a} - \vec{b}| = 3$, and $\vec{a}$ and $(\vec{a} - \vec{b})$ are perpendicular to each other, then the area of the triangle OPR is

[JEE Advanced 2026 Paper 2]

- (A) $\sqrt{3}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{3\sqrt{3}}{2}$ (D) $\frac{3}{2}$

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2. Let $\vec{w} = \hat{i} + \hat{j} - 2\hat{k}$, and $\vec{u}$ and $\vec{v}$ be two vectors, such that $\vec{u} \times \vec{v} = \vec{w}$ and $\vec{v} \times \vec{w} = \vec{u}$. Let α , β , γ , and t be real numbers such that

$$\vec{u} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}, \quad -\alpha + \beta + \gamma = 0, \quad \alpha - t\beta + \gamma = 0, \quad \text{and } \alpha + \beta - t\gamma = 0.$$

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

[JEE Advanced 2025 Paper 1]

List-I		List-II	
P.	$ \vec{v} ^2$ is equal to	1.	0
Q.	If $\alpha = \sqrt{3}$, then γ^2 is equal to	2.	1
R.	If $\alpha = \sqrt{3}$, then $(\beta + \gamma)^2$ is equal to	3.	2
S.	If $\alpha = \sqrt{2}$, then $t + 3$ is equal to	4.	3
		5.	5

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

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Space for Rough Work

SECTION-B : (Maximum Marks : 4)

- This section contains **ONE** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

3. Let $\vec{p} = 2\hat{i} + \hat{j} + 3\hat{k}$ and $\vec{q} = \hat{i} - \hat{j} + \hat{k}$. If for some real numbers α , β , and γ , we have $15\hat{i} + 10\hat{j} + 6\hat{k} = \alpha(2\vec{p} + \vec{q}) + \beta(\vec{p} - 2\vec{q}) + \gamma(\vec{p} \times \vec{q})$, then the value of γ is _____.

[JEE Advanced 2024 Paper 2]

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Space for Rough Work

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Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A																									
Ques.	1	2																							
Ans.	C	A																							

SECTION-B																									
Ques.	3																								
Ans.	2																								