

JEE MAIN VECTOR ALGEBRA — PYQS

Max. Marks: 156

Questions: 39

Section A (MCQ) — 31 questions

Q.1 Let $\vec{a} = 4\hat{i} - \hat{j} + 3\hat{k}$, $\vec{b} = 10\hat{i} + 2\hat{j} - \hat{k}$ and a vector $\vec{c}$ be such that $2(\vec{a} \times \vec{b}) + 3(\vec{b} \times \vec{c}) = \vec{0}$. If $\vec{a} \cdot \vec{c} = 15$, then $\vec{c} \cdot (\hat{i} + \hat{j} - 3\hat{k})$ is equal to :

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

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

 Scan or tap for the
full solution


Q.2 Let $\vec{a} = 2\hat{i} + 3\hat{j} + 3\hat{k}$ and $\vec{b} = 6\hat{i} + 3\hat{j} + 3\hat{k}$. Then the square of the area of the triangle with adjacent sides determined by the vectors $(2\vec{a} + 3\vec{b})$ and $(\vec{a} - \vec{b})$ is :

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

- (1) 450 (2) 900 (3) 1800 (4) 2400

 Scan or tap for the
full solution


Q.3 Let $\vec{a} = \sqrt{7}\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{j} + 2\hat{k}$. If $\vec{r}$ is a vector such that $\vec{r} \times \vec{a} + \vec{a} \times \vec{b} = \vec{0}$ and $\vec{r} \cdot \vec{a} = 0$, then $|3\vec{r}|^2$ is equal to :

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

- (1) 44 (2) 54 (3) 86 (4) 132

 Scan or tap for the
full solution


Q.4 Let O be the origin, $\vec{OP} = \vec{a}$ and $\vec{OQ} = \vec{b}$. If R is the point on $\vec{OP}$ such that $\vec{OP} = 5\vec{OR}$, and M is the point such that $\vec{OQ} = 5\vec{RM}$, then $\vec{PM}$ is equal to :

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

- (1) $\frac{1}{5}(\vec{a} - 4\vec{b})$ (2) $\frac{1}{5}(\vec{b} - 4\vec{a})$
 (3) $\frac{1}{5}(-\vec{a} + 4\vec{b})$ (4) $\frac{1}{5}(-\vec{b} + 4\vec{a})$

 Scan or tap for the
full solution


Q.5 Let $\hat{u}$ and $\hat{v}$ be unit vectors inclined at an acute angle such that $|\hat{u} \times \hat{v}| = \frac{\sqrt{3}}{2}$. If $\vec{A} = \lambda\hat{u} + \hat{v} + (\hat{u} \times \hat{v})$, then λ is equal to :

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

- (1) $\frac{4}{3}(\vec{A} \cdot \hat{u}) - \frac{2}{3}(\vec{A} \cdot \hat{v})$ (2) $\frac{2}{3}(\vec{A} \cdot \hat{u}) - \frac{1}{3}(\vec{A} \cdot \hat{v})$
 (3) $\frac{4}{3}(\vec{A} \cdot \hat{u}) + \frac{2}{3}(\vec{A} \cdot \hat{v})$ (4) $(\vec{A} \cdot \hat{u}) - \frac{1}{2}(\vec{A} \cdot \hat{v})$

 Scan or tap for the
full solution


Q.6 If $\vec{a}$ and $\vec{b}$ are two vectors such that $|\vec{a}| = 2$ and $|\vec{b}| = 3$, then the maximum value of $3|(3\vec{a} + 2\vec{b})| + 4|(3\vec{a} - 2\vec{b})|$ is :

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

- (1) 30 (2) 36 (3) 60 (4) 72

 Scan or tap for the
full solution


Q.7 Let the vectors $\vec{a} = -\hat{i} + \hat{j} + 3\hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} + \hat{k}$. For some $\lambda, \mu \in \mathbb{R}$, let $\vec{c} = \lambda\vec{a} + \mu\vec{b}$.

If $\vec{c} \cdot (3\hat{i} - 6\hat{j} + 2\hat{k}) = 10$ and $\vec{c} \cdot (\hat{i} + \hat{j} + \hat{k}) = -2$, then $|\vec{c}|^2$ is equal to :

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

- (1) 8 (2) 12 (3) 14 (4) 15

 Scan or tap for the
full solution


Q.8 Two adjacent sides of a parallelogram PQRS are given by $\vec{PQ} = \hat{j} + \hat{k}$ and $\vec{PS} = \hat{i} - \hat{j}$. If the side PS is rotated about the point P by an acute angle α in the plane of the parallelogram so that it becomes perpendicular to the side PQ, then

$\sin^2\left(\frac{5\alpha}{2}\right) - \sin^2\left(\frac{\alpha}{2}\right)$ is equal to :

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

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

 Scan or tap for the
full solution


Q.9 For three unit vectors $\vec{a}$, $\vec{b}$, $\vec{c}$ satisfying $|\vec{a} - \vec{b}|^2 + |\vec{b} - \vec{c}|^2 + |\vec{c} - \vec{a}|^2 = 9$ and $|2\vec{a} + k\vec{b} + k\vec{c}| = 3$, the positive value of k is :

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

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

 Scan or tap for the
full solution


- Q.10** Let P be a point in the plane of the vectors $\vec{AB} = 3\hat{i} + \hat{j} - \hat{k}$ and $\vec{AC} = \hat{i} - \hat{j} + 3\hat{k}$ such that P is equidistant from the lines AB and AC. If $|\vec{AP}| = \frac{\sqrt{5}}{2}$, then the area of the triangle ABP is :

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

- (1) $\frac{3}{2}$ (2) $\frac{\sqrt{30}}{4}$ (3) $\frac{\sqrt{26}}{4}$ (4) 2

Scan or tap for the full solution



- Q.11** Let $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$, $\vec{b} = \hat{i} + \hat{j}$ and $\vec{c} = \vec{a} \times \vec{b}$. Let $\vec{d}$ be a vector such that $|\vec{d} - \vec{a}| = \sqrt{11}$, $|\vec{c} \times \vec{d}| = 3$ and the angle between $\vec{c}$ and $\vec{d}$ is $\frac{\pi}{4}$. Then $\vec{a} \cdot \vec{d}$ is equal to

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

- (1) 0 (2) 1 (3) 3 (4) 11

Scan or tap for the full solution



- Q.12** Let $\vec{a} = 2\hat{i} - \hat{j} - \hat{k}$, $\vec{b} = \hat{i} + 3\hat{j} - \hat{k}$ and $\vec{c} = 2\hat{i} + \hat{j} + 3\hat{k}$. Let $\vec{v} = \vec{a} + \lambda\vec{b}$, $\lambda \in \mathbb{R}$, be the vector in the plane of the vectors $\vec{a}$ and $\vec{b}$, such that the length of its projection on the vector $\vec{c}$ is $\frac{1}{\sqrt{14}}$. Then $|\vec{v}|$ is equal to

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

- (1) $\frac{\sqrt{35}}{2}$ (2) 13 (3) $\frac{\sqrt{21}}{2}$ (4) 7

Scan or tap for the full solution



- Q.13** Let $\vec{a} = 2\hat{i} - 5\hat{j} + 5\hat{k}$ and $\vec{b} = \hat{i} - \hat{j} + 3\hat{k}$. If $\vec{c}$ is a vector such that $2(\vec{a} \times \vec{c}) + 3(\vec{b} \times \vec{c}) = \vec{0}$ and $(\vec{a} - \vec{b}) \cdot \vec{c} = -97$, then $|\vec{c} \times \hat{k}|^2$ is equal to

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

- (1) 193 (2) 205 (3) 218 (4) 233

Scan or tap for the full solution



- Q.14** Let $\vec{a} = -\hat{i} + \hat{j} + 2\hat{k}$, $\vec{b} = \hat{i} - \hat{j} - 3\hat{k}$, $\vec{c} = \vec{a} \times \vec{b}$ and $\vec{d} = \vec{c} \times \vec{a}$. Then $(\vec{a} - \vec{b}) \cdot \vec{d}$ is equal to :

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

- (1) 2 (2) -2 (3) 4 (4) -4

Scan or tap for the full solution



- Q.15** Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be three vectors such that $\vec{a} \times \vec{b} = 2(\vec{a} \times \vec{c})$. If $|\vec{a}| = 1$, $|\vec{b}| = 4$, $|\vec{c}| = 2$, and the angle between $\vec{b}$ and $\vec{c}$ is 60° , then $|\vec{a} \cdot \vec{c}|$ is equal to

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

- (1) 2 (2) 0 (3) 1 (4) 4

Scan or tap for the full solution



- Q.16** Let $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$, $\vec{c} = \lambda\hat{i} + \hat{j} + \hat{k}$ and $\vec{v} = \vec{a} \times \vec{b}$. If $\vec{v} \cdot \vec{c} = 11$ and the length of the projection of $\vec{b}$ on $\vec{c}$ is p, then $9p^2$ is equal to

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

- (1) 9 (2) 6 (3) 4 (4) 12

Scan or tap for the full solution



- Q.17** Let $\vec{AB} = 2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\vec{AD} = \hat{i} + 2\hat{j} + \lambda\hat{k}$, $\lambda \in \mathbb{R}$. Let the projection of the vector $\vec{v} = \hat{i} + \hat{j} + \hat{k}$ on the diagonal $\vec{AC}$ of the parallelogram ABCD be of length one unit. If α, β , where $\alpha > \beta$, be the roots of the equation $\lambda^2 x^2 - 6\lambda x + 5 = 0$, then $2\alpha - \beta$ is equal to

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

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

Scan or tap for the full solution



- Q.18** Let $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = \lambda\hat{j} + 2\hat{k}$, $\lambda \in \mathbb{Z}$ be two vectors. Let $\vec{c} = \vec{a} \times \vec{b}$ and $\vec{d}$ be a vector of magnitude 2 in yz-plane. If $|\vec{c}| = \sqrt{53}$, then the maximum possible value of $(\vec{c} \cdot \vec{d})^2$ is equal to :

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

- (1) 52 (2) 26 (3) 104 (4) 208

Scan or tap for the full solution



- Q.19** Let $\vec{a} = -\hat{i} + 2\hat{j} + 2\hat{k}$, $\vec{b} = 8\hat{i} + 7\hat{j} - 3\hat{k}$ and $\vec{c}$ be a vector such that $\vec{a} \times \vec{c} = \vec{b}$. If $\vec{c} \cdot (\hat{i} + \hat{j} + \hat{k}) = 4$, then $|\vec{a} + \vec{c}|^2$ is equal to :

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

- (1) 30 (2) 33 (3) 27 (4) 35

Scan or tap for the full solution



- Q.20** Let $\vec{c}$ and $\vec{d}$ be vectors such that $|\vec{c} + \vec{d}| = \sqrt{29}$ and $\vec{c} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = (2\hat{i} + 3\hat{j} + 4\hat{k}) \times \vec{d}$. If λ_1, λ_2 ($\lambda_1 > \lambda_2$) are the possible values of $(\vec{c} + \vec{d}) \cdot (-7\hat{i} + 2\hat{j} + 3\hat{k})$, then the equation

$K^2 x^2 + (K^2 - 5K + \lambda_1)xy + \left(3K + \frac{\lambda_2}{2}\right)y^2 - 8x + 12y + \lambda_2 = 0$ represents a circle, for K equal to :

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

- (1) 4 (2) -1 (3) 2 (4) 1

Scan or tap for the full solution



Q.21 For a triangle ABC, let $\vec{p} = \vec{BC}$, $\vec{q} = \vec{CA}$ and $\vec{r} = \vec{BA}$.

If $|\vec{p}| = 2\sqrt{3}$, $|\vec{q}| = 2$ and $\cos \theta = \frac{1}{\sqrt{3}}$, where θ is the angle between $\vec{p}$ and $\vec{q}$, then $|\vec{p} \times (\vec{q} - 3\vec{r})|^2 + 3|\vec{r}|^2$ is equal to :

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

- (1) 200 (2) 220 (3) 410 (4) 340

Scan or tap for the full solution



Q.22 Let $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$. Let $\vec{c}$ be a unit vector in the plane of the vectors $\vec{a}$ and $\vec{b}$ and be perpendicular to $\vec{a}$. Then such a vector $\vec{c}$ is:

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

- (1) $\frac{1}{\sqrt{2}}(-\hat{i} + \hat{k})$ (2) $\frac{1}{\sqrt{5}}(\hat{j} - 2\hat{k})$
(3) $\frac{1}{\sqrt{3}}(\hat{i} - \hat{j} + \hat{k})$ (4) $\frac{1}{\sqrt{3}}(-\hat{i} + \hat{j} - \hat{k})$

Scan or tap for the full solution



Q.23 Let the angle θ , $0 < \theta < \frac{\pi}{2}$ between two unit vectors $\hat{a}$ and $\hat{b}$ be $\sin^{-1}\left(\frac{\sqrt{65}}{9}\right)$. If the vector $\vec{c} = 3\hat{a} + 6\hat{b} + 9(\hat{a} \times \hat{b})$, then the value of $9(\vec{c} \cdot \hat{a}) - 3(\vec{c} \cdot \hat{b})$ is

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

- (1) 31 (2) 29 (3) 24 (4) 27

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Q.24 Let $\vec{a}$ and $\vec{b}$ be the vectors of the same magnitude such that $\frac{|\vec{a} + \vec{b}| + |\vec{a} - \vec{b}|}{|\vec{a} + \vec{b}| - |\vec{a} - \vec{b}|} = \sqrt{2} + 1$. Then $\frac{|\vec{a} + \vec{b}|^2}{|\vec{a}|^2}$ is :

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

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

Scan or tap for the full solution



Q.25 Consider two vectors $\vec{u} = 3\hat{i} - \hat{j}$ and $\vec{v} = 2\hat{i} + \hat{j} - \lambda\hat{k}$, $\lambda > 0$. The angle between them is given by $\cos^{-1}\left(\frac{\sqrt{5}}{2\sqrt{7}}\right)$. Let $\vec{v} = \vec{v}_1 + \vec{v}_2$, where $\vec{v}_1$ is parallel to $\vec{u}$ and $\vec{v}_2$ is perpendicular to $\vec{u}$. Then the value of $|\vec{v}_1|^2 + |\vec{v}_2|^2$ is equal to

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

- (1) $\frac{23}{2}$ (2) $\frac{25}{2}$ (3) 10 (4) 14

Scan or tap for the full solution



Q.26 Let ABCD be a tetrahedron such that the edges AB, AC and AD are mutually perpendicular. Let the areas of the triangles ABC, ACD and ADB be 5, 6 and 7 square units respectively. Then the area (in square units) of the $\triangle BCD$ is equal to :

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

- (1) $\sqrt{110}$ (2) 12 (3) $\sqrt{340}$ (4) $7\sqrt{3}$

Scan or tap for the full solution



Q.27 If $\vec{a}$ is a nonzero vector such that its projections on the vectors $2\hat{i} - \hat{j} + 2\hat{k}$, $\hat{i} + 2\hat{j} - 2\hat{k}$ and $\hat{k}$ are equal, then a unit vector along $\vec{a}$ is :

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

- (1) $\frac{1}{\sqrt{155}}(-7\hat{i} + 9\hat{j} + 5\hat{k})$
(2) $\frac{1}{\sqrt{155}}(-7\hat{i} + 9\hat{j} - 5\hat{k})$
(3) $\frac{1}{\sqrt{155}}(7\hat{i} + 9\hat{j} - 5\hat{k})$
(4) $\frac{1}{\sqrt{155}}(7\hat{i} + 9\hat{j} + 5\hat{k})$

Scan or tap for the full solution



Q.28 Let $\vec{a} = 2\hat{i} - 3\hat{j} + \hat{k}$, $\vec{b} = 3\hat{i} + 2\hat{j} + 5\hat{k}$ and a vector $\vec{c}$ be such that $(\vec{a} - \vec{c}) \times \vec{b} = -18\hat{i} - 3\hat{j} + 12\hat{k}$ and $\vec{a} \cdot \vec{c} = 3$. If $\vec{b} \times \vec{c} = \vec{d}$, then $|\vec{a} \cdot \vec{d}|$ is equal to :

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

- (1) 15 (2) 18 (3) 12 (4) 9

Scan or tap for the full solution



Q.29 Let $\vec{a} = 2\hat{i} - \hat{j} + 3\hat{k}$, $\vec{b} = 3\hat{i} - 5\hat{j} + \hat{k}$ and $\vec{c}$ be a vector such that $\vec{a} \times \vec{c} = \vec{c} \times \vec{b}$ and $(\vec{a} + \vec{c}) \cdot (\vec{b} + \vec{c}) = 168$. Then the maximum value of $|\vec{c}|^2$ is :

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

- (1) 77 (2) 154 (3) 308 (4) 462

Scan or tap for the full solution



Q.30 If the components of $\vec{a} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$ along and perpendicular to $\vec{b} = 3\hat{i} + \hat{j} - \hat{k}$ respectively, are $\frac{16}{11}(3\hat{i} + \hat{j} - \hat{k})$ and $\frac{1}{11}(-4\hat{i} - 5\hat{j} - 17\hat{k})$, then $\alpha^2 + \beta^2 + \gamma^2$ is equal to:

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

- (1) 16 (2) 23 (3) 26 (4) 18

Scan or tap for the full solution



Q.31 Let A, B, C be three points in xy-plane, whose position vectors are given by $\sqrt{3}\hat{i} + \hat{j}$, $\hat{i} + \sqrt{3}\hat{j}$ and $a\hat{i} + (1-a)\hat{j}$ respectively with respect to the origin O. If the distance of the point C from the line bisecting the angle between the vectors $\vec{OA}$ and $\vec{OB}$ is $\frac{9}{\sqrt{2}}$, then the sum of all the possible values of a is:

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

- (1) 2 (2) 0 (3) $\frac{9}{2}$ (4) 1

Scan or tap for the full solution



Section B (Numerical) — 8 questions

Q.32 If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{j} - \hat{k}$ and $\vec{c}$ be three vectors such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a} \cdot \vec{c} = 3$, then $\vec{c} \cdot (\vec{a} - 2\vec{b})$ is equal to _____.

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

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Q.33 Let $\vec{a}_k = (\tan \theta_k)\hat{i} + \hat{j}$ and $\vec{b}_k = \hat{i} - (\cot \theta_k)\hat{j}$, where $\theta_k = \frac{2^{k-1}\pi}{2^n + 1}$, for some $n \in \mathbb{N}$, $n > 5$. Then the value of $\frac{\sum_{k=1}^n |\vec{a}_k|^2}{\sum_{k=1}^n |\vec{b}_k|^2}$ is _____.

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

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Q.34 Let PQR be a triangle such that $\vec{PQ} = -2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{PR} = a\hat{i} + b\hat{j} - 4\hat{k}$, $a, b \in \mathbb{Z}$. Let S be the point on QR, which is equidistant from the lines PQ and PR. If $|\vec{PR}| = 9$ and $\vec{PS}$ is parallel to $\hat{i} - 7\hat{j} + 2\hat{k}$, then the value of $3a - 4b$ is _____.

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

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Q.35 Let a vector $\vec{a} = \sqrt{2}\hat{i} - \hat{j} + \lambda\hat{k}$, $\lambda > 0$, make an obtuse angle with the vector $\vec{b} = -\lambda^2\hat{i} + 4\sqrt{2}\hat{j} + 4\sqrt{2}\hat{k}$ and an angle θ , $\frac{\pi}{6} < \theta < \frac{\pi}{2}$, with the positive z-axis. If the set of all possible values of λ is $(\alpha, \beta) - \{\gamma\}$, then $\alpha + \beta + \gamma$ is equal to _____.

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

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Q.36 Let the three sides of a triangle ABC be given by the vectors $2\hat{i} - \hat{j} + \hat{k}$, $\hat{i} - 3\hat{j} - 5\hat{k}$ and $3\hat{i} - 4\hat{j} - 4\hat{k}$. Let G be the centroid of the triangle ABC. Then $6(|\vec{AG}|^2 + |\vec{BG}|^2 + |\vec{CG}|^2)$ is equal to _____.

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

Scan or tap for the full solution



Q.37 Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 3\hat{i} + 2\hat{j} - \hat{k}$, $\vec{c} = \lambda\hat{j} + \mu\hat{k}$ and $\vec{d}$ be a unit vector such that $\vec{a} \times \vec{d} = \vec{b} \times \vec{d}$ and $\vec{c} \cdot \vec{d} = 1$. If $\vec{c}$ is perpendicular to $\vec{a}$, then $|3\lambda\vec{d} + \mu\vec{c}|^2$ is equal to _____.

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

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Q.38 Let $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = 3\hat{i} - 3\hat{j} + 3\hat{k}$, $\vec{c} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{d}$ be a vector such that $\vec{b} \times \vec{d} = \vec{c} \times \vec{d}$ and $\vec{a} \cdot \vec{d} = 4$. Then $|(\vec{a} \times \vec{d})|^2$ is equal to _____.

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

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Q.39 Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{d} = \vec{a} \times \vec{b}$. If $\vec{c}$ is a vector such that $\vec{a} \cdot \vec{c} = |\vec{c}|$, $|\vec{c} - 2\vec{a}|^2 = 8$ and the angle between $\vec{d}$ and $\vec{c}$ is $\frac{\pi}{4}$, then $|10 - 3\vec{b} \cdot \vec{c}| + |\vec{d} \times \vec{c}|^2$ is equal to _____.

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

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ANSWER KEY

Section A (MCQ) — 31 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	3	1	2	1	3	2	2	2	2	1
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	3	2	3	4	1	4	3	4	1	1
Ques.	23	24	25	26	27	28	29	30	31		
Ans.	2	1	4	1	4	1	3	3	4		

Section B (Numerical) — 8 questions

Ques.	32	33	34	35	36	37	38
Ans.	3	3	37	5	164	5	128
Ques.	39						
Ans.	6						