Energy to Succeed!
ETOOS

VECTOR & 3D
DPP

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Vector & 3D

DPP-1

Q.1 A (1, –1, –3), B (2, 1, –2) & C (–5, 2, –6) are the position vectors of the vertices of a triangle ABC. The length of the bisector of its internal angle at A is :

(A) $\sqrt{10}/4$ (B) $3\sqrt{10}/4$ (C) $\sqrt{10}$ (D) none

Q.2 Let $\vec{r} = \vec{a} + \lambda\vec{l}$ and $\vec{r} = \vec{b} + \mu\vec{m}$ be two lines in space where $\vec{a} = 5\hat{i} + \hat{j} + 2\hat{k}$, $\vec{b} = -\hat{i} + 7\hat{j} + 8\hat{k}$, $\vec{l} = -4\hat{i} + \hat{j} - \hat{k}$ and $\vec{m} = 2\hat{i} - 5\hat{j} - 7\hat{k}$ then the p.v. of a point which lies on both of these lines, is

(A) $\hat{i} + 2\hat{j} + \hat{k}$ (B) $2\hat{i} + \hat{j} + \hat{k}$ (C) $\hat{i} + \hat{j} + 2\hat{k}$ (D) non existent as the lines are skew

Q.3 P, Q have position vectors $\vec{a}$ & $\vec{b}$ relative to the origin 'O' & X, Y divide $\overrightarrow{PQ}$ internally and externally respectively in the ratio 2 : 1. Vector $\overrightarrow{XY} =$

(A) $\frac{3}{2}(\vec{b} - \vec{a})$ (B) $\frac{4}{3}(\vec{a} - \vec{b})$ (C) $\frac{5}{6}(\vec{b} - \vec{a})$ (D) $\frac{4}{3}(\vec{b} - \vec{a})$

Q.4 Let $\vec{p}$ is the p.v. of the orthocentre & $\vec{g}$ is the p.v. of the centroid of the triangle ABC where circumcentre is the origin. If $\vec{p} = K\vec{g}$, then K =

(A) 3 (B) 2 (C) 1/3 (D) 2/3

Q.5 A vector $\vec{a}$ has components 2p & 1 with respect to a rectangular cartesian system. The system is rotated through a certain angle about the origin in the counterclockwise sense. If with respect to the new system, $\vec{a}$ has components p + 1 & 1 then ,

(A) p = 0 (B) p = 1 or p = – 1/3
(C) p = – 1 or p = 1/3 (D) p = 1 or p = – 1

Q.6 The number of vectors of unit length perpendicular to vectors $\vec{a} = (1, 1, 0)$ & $\vec{b}$ (0, 1, 1) is:

(A) 1 (B) 2 (C) 3 (D) ∞

Q.7 Four points A(+1, –1, 1) ; B(1, 3, 1) ; C(4, 3, 1) and D(4, – 1, 1) taken in order are the vertices of
(A) a parallelogram which is neither a rectangle nor a rhombus
(B) rhombus
(C) an isosceles trapezium
(D) a cyclic quadrilateral.

Q.8 Let α, β & γ be distinct real numbers. The points whose position vector's are $\alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$; $\beta\hat{i} + \gamma\hat{j} + \alpha\hat{k}$ and $\gamma\hat{i} + \alpha\hat{j} + \beta\hat{k}$

(A) are collinear (B) form an equilateral triangle
(C) form a scalene triangle (D) form a right angled triangle

Q.9 If the vectors $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$, $\vec{b} = -\hat{i} + 3\hat{j} + 4\hat{k}$ & $\vec{c} = 4\hat{i} - 2\hat{j} - 6\hat{k}$ constitute the sides of a ΔABC, then the length of the median bisecting the vector $\vec{c}$ is

(A) $\sqrt{2}$ (B) $\sqrt{14}$ (C) $\sqrt{74}$ (D) $\sqrt{6}$

Q.10 P be a point interior to the acute triangle ABC. If $\overrightarrow{PA}+\overrightarrow{PB}+\overrightarrow{PC}$ is a null vector then w.r.t. the triangle ABC, the point P is, its

(A) centroid (B) orthocentre (C) incentre (D) circumcentre

Q.11 A vector of magnitude 10 along the normal to the curve $3x^2+8xy+2y^2-3=0$ at its point P(1, 0) can be

(A) $6\hat{i}+8\hat{j}$ (B) $-8\hat{i}+3\hat{j}$ (C) $6\hat{i}-8\hat{j}$ (D) $8\hat{i}+6\hat{j}$

Q.12 Consider the points A, B and C with position vectors $\left(-2\hat{i}+3\hat{j}+5\hat{k}\right)$, $\left(\hat{i}+2\hat{j}+3\hat{k}\right)$ and $7\hat{i}-\hat{k}$ respectively.

Statement-1: The vector sum, $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{CA}=\vec{0}$

because

Statement-2: A, B and C form the vertices of a triangle.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false. (D) Statement-1 is false, statement-2 is true.

DPP-2

Q.1 If the three points with position vectors (1, a, b) ; (a, 2, b) and (a, b, 3) are collinear in space, then the value of a + b is

(A) 3 (B) 4 (C) 5 (D) none

Q.2 Consider the following 3 lines in space

$L_1 : \vec{r} = 3\hat{i} - \hat{j} + 2\hat{k} + \lambda(2\hat{i} + 4\hat{j} - \hat{k})$

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

$L_3 : \vec{r} = 3\hat{i} + 2\hat{j} - 2\hat{k} + t(2\hat{i} + \hat{j} + 2\hat{k})$

Then which one of the following pair(s) are in the same plane.

(A) only L_1L_2 (B) only L_2L_3 (C) only L_3L_1 (D) L_1L_2 and L_2L_3

Q.3 The acute angle between the medians drawn from the acute angles of an isosceles right angled triangle is:

(A) $\cos^{-1}(2/3)$ (B) $\cos^{-1}(3/4)$ (C) $\cos^{-1}(4/5)$ (D) none

Q.4 If $\vec{e}_1$ & $\vec{e}_2$ are two unit vectors and θ is the angle between them, then $\cos(\theta/2)$ is

(A) $\frac{1}{2}|\vec{e}_1 + \vec{e}_2|$ (B) $\frac{1}{2}|\vec{e}_1 - \vec{e}_2|$ (C) $\frac{\vec{e}_1 \cdot \vec{e}_2}{2}$ (D) $\frac{|\vec{e}_1 \times \vec{e}_2|}{2|\vec{e}_1||\vec{e}_2|}$

Q.5 The vectors $3\hat{i} - 2\hat{j} + \hat{k}$, $\hat{i} - 3\hat{j} + 5\hat{k}$ & $2\hat{i} + \hat{j} - 4\hat{k}$ form the sides of a triangle. Then triangle is

(A) an acute angled triangle (B) an obtuse angled triangle

(C) an equilateral triangle (D) a right angled triangle

Q.6 If the vectors $3\bar{p} + \bar{q}$; $5\bar{p} - 3\bar{q}$ and $2\bar{p} + \bar{q}$; $4\bar{p} - 2\bar{q}$ are pairs of mutually perpendicular vectors then $\sin\left(\bar{p} \wedge \bar{q}\right)$ is

(A) $\sqrt{55}/4$ (B) $\sqrt{55}/8$ (C) $3/16$ (D) $\sqrt{247}/16$

Q.7 Consider the points A, B and C with position vectors $\left(-2\hat{i} + 3\hat{j} + 5\hat{k}\right)$, $\left(\hat{i} + 2\hat{j} + 3\hat{k}\right)$ and $7\hat{i} - \hat{k}$ respectively.

Statement-1: The vector sum, $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} = \vec{0}$

because

Statement-2: A, B and C form the vertices of a triangle.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false. (D) Statement-1 is false, statement-2 is true.

Q.8 The set of values of c for which the angle between the vectors $cx\hat{i} - 6\hat{j} + 3\hat{k}$ & $x\hat{i} - 2\hat{j} + 2cx\hat{k}$ is acute for every $x \in R$ is

(A) (0, 4/3) (B) [0, 4/3] (C) (11/9, 4/3) (D) [0, 4/3)

Q.9 Let $\vec{u} = \hat{i} + \hat{j}$, $\vec{v} = \hat{i} - \hat{j}$ and $\vec{w} = \hat{i} + 2\hat{j} + 3\hat{k}$. If $\hat{n}$ is a unit vector such that $\vec{u} \cdot \hat{n} = 0$ and $\vec{v} \cdot \hat{n} = 0$, then $|\vec{w} \cdot \hat{n}|$ is equal to

(A) 1 (B) 2 (C) 3 (D) 0

Q.10 If the vector $6\hat{i} - 3\hat{j} - 6\hat{k}$ is decomposed into vectors parallel and perpendicular to the vector $\hat{i} + \hat{j} + \hat{k}$ then the vectors are :

(A) $-\left(\hat{i} + \hat{j} + \hat{k}\right)$ & $7\hat{i} - 2\hat{j} - 5\hat{k}$ (B) $-2\left(\hat{i} + \hat{j} + \hat{k}\right)$ & $8\hat{i} - \hat{j} - 4\hat{k}$

(C) $+2\left(\hat{i} + \hat{j} + \hat{k}\right)$ & $4\hat{i} - 5\hat{j} - 8\hat{k}$ (D) none

DPP-3

Q.1 If $\vec{a}+\vec{b}+\vec{c}=0$, $|\vec{a}|=3$, $|\vec{b}|=5$, $|\vec{c}|=7$, then the angle between $\vec{a}$ & $\vec{b}$ is :

(A) $\pi/6$ (B) $2\pi/3$ (C) $5\pi/3$ (D) $\pi/3$

Q.2 The lengths of the diagonals of a parallelogram constructed on the vectors $\vec{p}=2\vec{a}+\vec{b}$ & $\vec{q}=\vec{a}-2\vec{b}$, where $\vec{a}$ & $\vec{b}$ are unit vectors forming an angle of 60º are :

(A) 3 & 4 (B) $\sqrt{7}$ & $\sqrt{13}$ (C) $\sqrt{5}$ & $\sqrt{11}$ (D) none

Q.3 Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be vectors of length 3, 4, 5 respectively. Let $\vec{a}$ be perpendicular to $\vec{b}+\vec{c}$, $\vec{b}$ to $\vec{c}+\vec{a}$ & $\vec{c}$ to $\vec{a}+\vec{b}$. Then $|\vec{a}+\vec{b}+\vec{c}|$ is :

(A) $2\sqrt{5}$ (B) $2\sqrt{2}$ (C) $10\sqrt{5}$ (D) $5\sqrt{2}$

Q.4 Given a parallelogram ABCD. If $|\vec{AB}|=a$, $|\vec{AD}|=b$ & $|\vec{AC}|=c$, then $\vec{DB}\cdot\vec{AB}$ has the value

(A) $\frac{3a^2+b^2-c^2}{2}$ (B) $\frac{a^2+3b^2-c^2}{2}$ (C) $\frac{a^2-b^2+3c^2}{2}$ (D) none

Q.5 The set of values of x for which the angle between the vectors $\vec{a}=x\hat{i}-3\hat{j}-\hat{k}$ and $\vec{b}=2x\hat{i}+x\hat{j}-\hat{k}$ acute and the angle between the vector $\vec{b}$ and the axis of ordinates is obtuse, is

(A) $1<x<2$ (B) $x>2$ (C) $x<1$ (D) $x<0$

Q.6 If a vector $\vec{a}$ of magnitude 50 is collinear with vector $\vec{b}=6\hat{i}-8\hat{j}-\frac{15}{2}\hat{k}$ and makes an acute angle with positive z-axis then :

(A) $\vec{a}=4\vec{b}$ (B) $\vec{a}=-4\vec{b}$ (C) $\vec{b}=4\vec{a}$ (D) none

Q.7 A, B, C & D are four points in a plane with pv's $\vec{a}$, $\vec{b}$, $\vec{c}$ & $\vec{d}$ respectively such that $(\vec{a}-\vec{d})\cdot(\vec{b}-\vec{c})=(\vec{b}-\vec{d})\cdot(\vec{c}-\vec{a})=0$. Then for the triangle ABC, D is its

(A) incentre (B) circumcentre (C) orthocentre (D) centroid

Q.8 Let $\vec{A}$ & $\vec{B}$ be two non parallel unit vectors in a plane. If $(\alpha\vec{A}+\vec{B})$ bisects the internal angle between $\vec{A}$ & $\vec{B}$, then α is equal to

(A) 1/2 (B) 1 (C) 2 (D) – 1

Q.9 Image of the point P with position vector $7\hat{i}-\hat{j}+2\hat{k}$ in the line whose vector equation is, $\vec{r}=9\hat{i}+5\hat{j}+5\hat{k}+\lambda(\hat{i}+3\hat{j}+5\hat{k})$ has the position vector

(A) (– 9, 5, 2) (B) (9, 5, – 2) (C) (9, – 5, – 2) (D) none

Q.10 Let $\hat{a}$, $\hat{b}$, $\hat{c}$ are three unit vectors such that $\hat{a}+\hat{b}+\hat{c}$ is also a unit vector. If pairwise angles between $\hat{a}$, $\hat{b}$, $\hat{c}$ are θ_1, θ_2 and θ_3 respectively then $\cos\theta_1+\cos\theta_2+\cos\theta_3$ equals

(A) 3 (B) – 3 (C) 1 (D) – 1

Q.11 A tangent is drawn to the curve $y = \frac{8}{x^2}$ at a point $A(x_1, y_1)$, where $x_1 = 2$. The tangent cuts the x-axis at point B. Then the scalar product of the vectors $\vec{AB}$ & $\vec{OB}$ is

(A) 3 (B) – 3 (C) 6 (D) – 6

Q.12 L_1 and L_2 are two lines whose vector equations are

$$L_1 : \vec{r} = \lambda\left[\left(\cos\theta + \sqrt{3}\right)\hat{i} + \left(\sqrt{2}\sin\theta\right)\hat{j} + \left(\cos\theta - \sqrt{3}\right)\hat{k}\right]$$

$$L_2 : \vec{r} = \mu\left(a\hat{i} + b\hat{j} + c\hat{k}\right),$$

where λ and μ are scalars and α is the acute angle between L_1 and L_2.
If the angle 'α' is independent of θ then the value of 'α' is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

DPP-4

Q.1 Cosine of an angle between the vectors $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ if $|\vec{a}|=2, |\vec{b}|=1$ and $\vec{a}\wedge\vec{b}=60°$ is

(A) $\sqrt{3/7}$ (B) $9/\sqrt{21}$ (C) $3/\sqrt{7}$ (D) none

Q.2 An arc AC of a circle subtends a right angle at the centre O. The point B divides the arc in the ratio 1 : 2. If $\overrightarrow{OA}=\vec{a}$ & $\overrightarrow{OB}=\vec{b}$, then the vector $\overrightarrow{OC}$ in terms of $\vec{a}$ & $\vec{b}$, is

(A) $\sqrt{3}\,\vec{a}-2\vec{b}$ (B) $-\sqrt{3}\,\vec{a}+2\vec{b}$ (C) $2\vec{a}-\sqrt{3}\,\vec{b}$ (D) $-2\vec{a}+\sqrt{3}\,\vec{b}$

Q.3 For two particular vectors $\vec{A}$ and $\vec{B}$ it is known that $\vec{A}\times\vec{B}=\vec{B}\times\vec{A}$. What must be true about the two vectors?

(A) At least one of the two vectors must be the zero vector.
(B) $\vec{A}\times\vec{B}=\vec{B}\times\vec{A}$ is true for any two vectors.
(C) One of the two vectors is a scalar multiple of the other vector.
(D) The two vectors must be perpendicular to each other.

Q.4 'P' is a point inside the triangle ABC, such that $BC\left(\overrightarrow{PA}\right)+CA\left(\overrightarrow{PB}\right)+AB\left(\overrightarrow{PC}\right)=0$, then for the triangle ABC the point P is its :

(A) incentre (B) circumcentre (C) centroid (D) orthocentre

Q.5 The vector equations of two lines L_1 and L_2 are respectivly

$\vec{r}=17\hat{i}-9\hat{j}+9\hat{k}+\lambda(3\hat{i}+\hat{j}+5\hat{k})$ and $\vec{r}=15\hat{i}-8\hat{j}-\hat{k}+\mu(4\hat{i}+3\hat{j})$

I L_1 and L_2 are skew lines
II $(11,-11,-1)$ is the point of intersection of L_1 and L_2
III $(-11, 11, 1)$ is the point of intersection of L_1 and L_2
IV $\cos^{-1}\left(3/\sqrt{35}\right)$ is the acute angle between L_1 and L_2

then, which of the following is true?

(A) II and IV (B) I and IV (C) IV only (D) III and IV

Q.6 Given three vectors $\vec{a}$, $\vec{b}$ & $\vec{c}$ each two of which are non collinear. Further if $\left(\vec{a}+\vec{b}\right)$ is collinear with $\vec{c}$, $\left(\vec{b}+\vec{c}\right)$ is collinear with $\vec{a}$ & $|\vec{a}|=|\vec{b}|=|\vec{c}|=\sqrt{2}$. Then the value of $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}$:

(A) is 3 (B) is -3 (C) is 0 (D) cannot be evaluated

Q.7 For some non zero vector $\vec{V}$, if the sum of $\vec{V}$ and the vector obtained from $\vec{V}$ by rotating it by an angle 2α equals to the vector obtained from $\vec{V}$ by rotating it by α then the value of α, is

(A) $2n\pi \pm \frac{\pi}{3}$ (B) $n\pi \pm \frac{\pi}{3}$ (C) $2n\pi \pm \frac{2\pi}{3}$ (D) $n\pi \pm \frac{2\pi}{3}$

where n is an integer.

Q.8 Let $\vec{u}, \vec{v}, \vec{w}$ be such that $|\vec{u}| = 1,\ |\vec{v}| = 2,\ |\vec{w}| = 3$. If the projection of $\vec{v}$ along $\vec{u}$ is equal to that of $\vec{w}$ along $\vec{u}$ and vectors $\vec{v}$, $\vec{w}$ are perpendicular to each other then $|\vec{u} - \vec{v} + \vec{w}|$ equals

(A) 2 (B) $\sqrt{7}$ (C) $\sqrt{14}$ (D) 14

Q.9 If $\vec{a}$ and $\vec{b}$ are non zero, non collinear, and the linear combination $(2x - y)\vec{a} + 4\vec{b} = 5\vec{a} + (x - 2y)\vec{b}$ holds for real x and y then x + y has the value equal to

(A) – 3 (B) 1 (C) 17 (D) 3

Q.10 In the isosceles triangle ABC $|\vec{AB}| = |\vec{BC}| = 8$, a point E divides AB internally in the ratio 1 : 3, then the cosine of the angle between $\vec{CE}$ & $\vec{CA}$ is (where $|\vec{CA}| = 12$)

(A) $-\frac{3\sqrt{7}}{8}$ (B) $\frac{3\sqrt{8}}{17}$ (C) $\frac{3\sqrt{7}}{8}$ (D) $\frac{-3\sqrt{8}}{17}$

Q.11 If $\vec{p} = 3\vec{a} - 5\vec{b}$; $\vec{q} = 2\vec{a} + \vec{b}$; $\vec{r} = \vec{a} + 4\vec{b}$; $\vec{s} = -\vec{a} + \vec{b}$ are four vectors such that $\sin(\vec{p} \wedge \vec{q}) = 1$ and $\sin(\vec{r} \wedge \vec{s}) = 1$ then $\cos(\vec{a} \wedge \vec{b})$ is :

(A) $-\frac{19}{5\sqrt{43}}$ (B) 0 (C) 1 (D) $\frac{19}{5\sqrt{43}}$

Q.12 Given an equilateral triangle ABC with side length equal to 'a'. Let M and N be two points respectively on the side AB and AC much that $\overrightarrow{AN} = K\overrightarrow{AC}$ and $\overrightarrow{AM} = \frac{\overrightarrow{AB}}{3}$. If $\overrightarrow{BN}$ and $\overrightarrow{CM}$ are orthogonal then the value of K is equal to

(A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

DPP-5

Q.1 If $\vec{e}_1$ & $\vec{e}_2$ are two unit vectors and θ is the angle between them, then $\sin(\theta/2)$ is :

(A) $\frac{1}{2}|\vec{e}_1+\vec{e}_2|$ (B) $\frac{1}{2}|\vec{e}_1-\vec{e}_2|$ (C) $\frac{\vec{e}_1 . \vec{e}_2}{2}$ (D) $\frac{|\vec{e}_1 \times \vec{e}_2|}{2|\vec{e}_1||\vec{e}_2|}$

Q.2 If $\vec{p}$ & $\vec{s}$ are not perpendicular to each other and $\vec{r} \times \vec{p} = \vec{q} \times \vec{p}$ & $\vec{r} . \vec{s} = 0$, then $\vec{r}$ =

(A) $\vec{p} . \vec{s}$ (B) $\vec{q} + \left(\frac{\vec{q} . \vec{p}}{\vec{p} . \vec{s}}\right)\vec{p}$ (C) $\vec{q} - \left(\frac{\vec{q} . \vec{s}}{\vec{p} . \vec{s}}\right)\vec{p}$ (D) $\vec{q} + \mu\vec{p}$ for all scalars μ

Q.3 If $\vec{u} = \vec{a} - \vec{b}$; $\vec{v} = \vec{a} + \vec{b}$ and $|\vec{a}| = |\vec{b}| = 2$ then $|\vec{u} \times \vec{v}|$ is equal to

(A) $\sqrt{2(16-(\vec{a}.\vec{b})^2)}$ (B) $2\sqrt{(16-(\vec{a}.\vec{b})^2)}$ (C) $2\sqrt{(4-(\vec{a}.\vec{b})^2)}$ (D) $\sqrt{2}\,(4-(\vec{a}.\vec{b})^2)$

Q.4 If $\vec{u}$ and $\vec{v}$ are two vectors such that $|\vec{u}| = 3$; $|\vec{v}| = 2$ and $|\vec{u} \times \vec{v}| = 6$ then the correct statement is

(A) $\vec{u} \wedge \vec{v} \in (0, 90°)$ (B) $\vec{u} \wedge \vec{v} \in (90°, 180°)$ (C) $\vec{u} \wedge \vec{v} = 90°$ (D) $(\vec{u} \times \vec{v}) \times \vec{u} = 6\vec{v}$

Q.5 If $\vec{A} = (1, 1, 1)$, $\vec{C} = (0, 1, -1)$ are given vectors, then a vector $\vec{B}$ satisfying the equation $\vec{A} \times \vec{B} = \vec{C}$ and $\vec{A} . \vec{B} = 3$ is :

(A) (5, 2, 2) (B) $\left(\frac{5}{3}, \frac{2}{3}, \frac{2}{3}\right)$ (C) $\left(\frac{2}{3}, \frac{5}{3}, \frac{2}{3}\right)$ (D) $\left(\frac{2}{3}, \frac{2}{3}, \frac{5}{3}\right)$

Q.6 Given a parallelogram OACB. The lengths of the vectors $\vec{OA}$, $\vec{OB}$ & $\vec{AB}$ are a, b & c respectively. The scalar product of the vectors $\vec{OC}$ & $\vec{OB}$ is :

(A) $\frac{a^2-3b^2+c^2}{2}$ (B) $\frac{3a^2+b^2-c^2}{2}$ (C) $\frac{3a^2-b^2+c^2}{2}$ (D) $\frac{a^2+3b^2-c^2}{2}$

Q.7 Vectors $\vec{a}$ & $\vec{b}$ make an angle $\theta = \frac{2\pi}{3}$. If $|\vec{a}| = 1$, $|\vec{b}| = 2$ then $\left\{(\vec{a} + 3\vec{b}) \times (3\vec{a} - \vec{b})\right\}^2 =$

(A) 225 (B) 250 (C) 275 (D) 300

Q.8 In a quadrilateral ABCD, $\vec{AC}$ is the bisector of the $\left(\vec{AB} \wedge \vec{AD}\right)$ which is $\frac{2\pi}{3}$,

$15|\vec{AC}| = 3|\vec{AB}| = 5|\vec{AD}|$ then $\cos\left(\vec{BA} \wedge \vec{CD}\right)$ is :

(A) $-\frac{\sqrt{14}}{7\sqrt{2}}$ (B) $-\frac{\sqrt{21}}{7\sqrt{3}}$ (C) $\frac{2}{\sqrt{7}}$ (D) $\frac{2\sqrt{7}}{14}$

Q.9 If the two adjacent sides of two rectangles are represented by the vectors $\vec{p} = 5\vec{a} - 3\vec{b}\,;\vec{q} = -\vec{a} - 2\vec{b}$ and $\vec{r} = -4\vec{a} - \vec{b}\,;\vec{s} = -\vec{a} + \vec{b}$ respectively, then the angle between the vectors $\vec{x} = \frac{1}{3}(\vec{p} + \vec{r} + \vec{s})$ and $\vec{y} = \frac{1}{5}(\vec{r} + \vec{s})$

(A) is $-\cos^{-1}\left(\frac{19}{5\sqrt{43}}\right)$
(B) is $\cos^{-1}\left(\frac{19}{5\sqrt{43}}\right)$
(C) is $\pi - \cos^{-1}\left(\frac{19}{5\sqrt{43}}\right)$
(D) cannot be evaluated

Q.10 If the vector product of a constant vector $\vec{OA}$ with a variable vector $\vec{OB}$ in a fixed plane OAB be a constant vector, then locus of B is :

(A) a straight line perpendicular to $\vec{OA}$
(B) a circle with centre O radius equal to $|\vec{OA}|$
(C) a straight line parallel to $\vec{OA}$
(D) none of these

Q.11 If the distance from the point P(1, 1, 1) to the line passing through the points Q(0, 6, 8) and R(–1, 4, 7) is expressed in the form $\sqrt{p/q}$ where p and q are coprime, then the value of $\frac{(p+q)(p+q-1)}{2}$ equals

(A) 4950
(B) 5050
(C) 5150
(D) none

DPP-6

Q.1 For non-zero vectors $\vec{a}$, $\vec{b}$, $\vec{c}$, $|\vec{a} \times \vec{b}.\vec{c}| = |\vec{a}|\,|\vec{b}|\,|\vec{c}|$ holds if and only if ;

(A) $\vec{a}.\vec{b} = 0,\ \vec{b}.\vec{c} = 0$ (B) $\vec{c}.\vec{a} = 0,\ \vec{a}.\vec{b} = 0$

(C) $\vec{a}.\vec{c} = 0,\ \vec{b}.\vec{c} = 0$ (D) $\vec{a}.\vec{b} = \vec{b}.\vec{c} = \vec{c}.\vec{a} = 0$

Q.2 The vectors $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$; $\vec{b} = 2\hat{i} - \hat{j} + \hat{k}$ & $\vec{c} = 3\hat{i} + \hat{j} + 4\hat{k}$ are so placed that the end point of one vector is the starting point of the next vector. Then the vectors are

(A) not coplanar (B) coplanar but cannot form a triangle

(C) coplanar but can form a triangle (D) coplanar & can form a right angled triangle

Q.3 Given the vectors

$$\vec{u} = 2\hat{i} - \hat{j} - \hat{k}$$
$$\vec{v} = \hat{i} - \hat{j} + 2\hat{k}$$
$$\vec{w} = \hat{i} - \hat{k}$$

If the volume of the parallelopiped having $-c\vec{u}$, $\vec{v}$ and $c\vec{w}$ as concurrent edges, is 8 then 'c' can be equal to

(A) ± 2 (B) 4 (C) 8 (D) can not be determined

Q.4 Given $\bar{a} = x\hat{i} + y\hat{j} + 2\hat{k}$, $\bar{b} = \hat{i} - \hat{j} + \hat{k}$, $\bar{c} = \hat{i} + 2\hat{j}$; $(\bar{a} \,\hat{}\, \bar{b}) = \pi/2$, $\bar{a} \cdot \bar{c} = 4$ then

(A) $[\bar{a}\ \bar{b}\ \bar{c}]^2 = |\bar{a}|$ (B) $[\bar{a}\ \bar{b}\ \bar{c}] = |\bar{a}|$ (C) $[\bar{a}\ \bar{b}\ \bar{c}] = 0$ (D) $[\bar{a}\ \bar{b}\ \bar{c}] = |\bar{a}|^2$

Q.5 The set of values of m for which the vectors $\hat{i} + \hat{j} + m\hat{k}$, $\hat{i} + \hat{j} + (m+1)\hat{k}$ & $\left(\hat{i} - \hat{j} + m\hat{k}\right)$ are non-coplanar :

(A) R (B) $R - \{1\}$ (C) $R - \{-2\}$ (D) ϕ

Q.6 Let a, b, c be distinct non-negative numbers. If the vectors $a\hat{i} + a\hat{j} + c\hat{k}$, $\hat{i} + \hat{k}$ & $c\hat{i} + c\hat{j} + b\hat{k}$ lie in a plane, then c is :

(A) the A.M. of a & b (B) the G. M. of a & b

(C) the H. M. of a & b (D) equal to zero.

Q.7 Let $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$; $\vec{b} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$; $\vec{c} = c_1\hat{i} + c_2\hat{j} + c_3\hat{k}$ be three non-zero vectors such that $\vec{c}$ is a unit vector perpendicular to both $\vec{a}$ & $\vec{b}$. If the angle between $\vec{a}$ & $\vec{b}$ is $\frac{\pi}{6}$ then $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}^2 =$

(A) 0 (B) 1

(C) $\frac{1}{4}(a_1^2 + a_2^2 + a_3^2)(b_1^2 + b_2^2 + b_3^2)$ (D) $\frac{3}{4}(a_1^2 + a_2^2 + a_3^2)(b_1^2 + b_2^2 + b_3^2)(c_1^2 + c_2^2 + c_3^2)$

Q.8 For three vectors $\vec{u}$, $\vec{v}$, $\vec{w}$ which of the following expressions is not equal to any of the remaining three?

(A) $\vec{u}.(\vec{v} \times \vec{w})$ (B) $(\vec{v} \times \vec{w}).\vec{u}$ (C) $\vec{v}.(\vec{u} \times \vec{w})$ (D) $(\vec{u} \times \vec{v}).\vec{w}$

Q.9 The vector $\vec{c}$ is perpendicular to the vectors $\vec{a} = (2, -3, 1)$, $\vec{b} = (1, -2, 3)$ and satisfies the condition $\vec{c} \cdot \left(\hat{i} + 2\hat{j} - 7\hat{k}\right) = 10$. Then the vector $\vec{c}$ =

(A) (7, 5, 1) (B) (– 7, – 5, –1) (C) (1, 1, –1) (D) none

Q.10 Let $\vec{a} = \hat{i} + \hat{j}$, $\vec{b} = \hat{j} + \hat{k}$ & $\vec{c} = \alpha\vec{a} + \beta\vec{b}$. If the vectors, $\hat{i} - 2\hat{j} + \hat{k}$, $3\hat{i} + 2\hat{j} - \hat{k}$ & $\vec{c}$ are coplanar then $\frac{\alpha}{\beta}$ is :

(A) 1 (B) 2 (C) 3 (D) – 3

Q.11 A rigid body rotates about an axis through the origin with an angular velocity $10\sqrt{3}$ radians/sec. If $\vec{\omega}$ points in the direction of $\hat{i} + \hat{j} + \hat{k}$ then the equation to the locus of the points having tangential speed 20 m/sec. is :

(A) $x^2 + y^2 + z^2 - xy - yz - zx - 1 = 0$
(B) $x^2 + y^2 + z^2 - 2xy - 2yz - 2zx - 1 = 0$
(C) $x^2 + y^2 + z^2 - xy - yz - zx - 2 = 0$
(D) $x^2 + y^2 + z^2 - 2xy - 2yz - 2zx - 2 = 0$

Q.12 A rigid body rotates with constant angular velocity ω about the line whose vector equation is, $\vec{r} = \lambda\left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$. The speed of the particle at the instant it passes through the point with p.v. $2\hat{i} + 3\hat{j} + 5\hat{k}$ is :

(A) $\omega\sqrt{2}$ (B) 2ω (C) $\omega/\sqrt{2}$ (D) none

Q.13 Given 3 vectors

$$\vec{V}_1 = a\hat{i} + b\hat{j} + c\hat{k}; \qquad \vec{V}_2 = b\hat{i} + c\hat{j} + a\hat{k}; \qquad \vec{V}_3 = c\hat{i} + a\hat{j} + b\hat{k}$$

In which one of the following conditions $\vec{V}_1$, $\vec{V}_2$ and $\vec{V}_3$ are linearly independent?

(A) $a + b + c = 0$ and $a^2 + b^2 + c^2 \neq ab + bc + ca$
(B) $a + b + c = 0$ and $a^2 + b^2 + c^2 = ab + bc + ca$
(C) $a + b + c \neq 0$ and $a^2 + b^2 + c^2 = ab + bc + ca$
(D) $a + b + c \neq 0$ and $a^2 + b^2 + c^2 \neq ab + bc + ca$

Q.14 If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ & $\vec{b} = \hat{i} - 2\hat{j} + \hat{k}$, then the vector $\vec{c}$ such that $\vec{a} \cdot \vec{c} = 2$ & $\vec{a} \times \vec{c} = \vec{b}$ is

(A) $\frac{1}{3}\left(3\hat{i} - 2\hat{j} + 5\hat{k}\right)$ (B) $\frac{1}{3}\left(-\hat{i} + 2\hat{j} + 5\hat{k}\right)$ (C) $\frac{1}{3}\left(\hat{i} + 2\hat{j} - 5\hat{k}\right)$ (D) $\frac{1}{3}\left(3\hat{i} + 2\hat{j} + \hat{k}\right)$

One or more than one is/are correct:

Q.15 If $\vec{a}$, $\vec{b}$, $\vec{c}$ be three non zero vectors satisfying the condition $\vec{a} \times \vec{b} = \vec{c}$ & $\vec{b} \times \vec{c} = \vec{a}$ then which of the following always hold(s) good?

(A) $\vec{a}$, $\vec{b}$, $\vec{c}$ are orthogonal in pairs (B) $\left[\vec{a}\ \vec{b}\ \vec{c}\right] = \left|\vec{b}\right|$

(C) $\left[\vec{a}\ \vec{b}\ \vec{c}\right] = \left|\vec{c}\right|^2$ (D) $\left|\vec{b}\right| = \left|\vec{c}\right|$

DPP-7

Q.1 The altitude of a parallelopiped whose three coterminous edges are the vectors, $\vec{A} = \hat{i} + \hat{j} + \hat{k}$; $\vec{B} = 2\hat{i} + 4\hat{j} - \hat{k}$ & $\vec{C} = \hat{i} + \hat{j} + 3\hat{k}$ with $\vec{A}$ and $\vec{B}$ as the sides of the base of the parallelopiped, is

(A) $2/\sqrt{19}$ (B) $4/\sqrt{19}$ (C) $2\sqrt{38}/19$ (D) none

Q.2 Consider Δ ABC with A ≡ $(\bar{a})$; B ≡ $(\bar{b})$ & C ≡ $(\bar{c})$. If $\bar{b} . (\bar{a} + \bar{c}) = \bar{b} . \bar{b} + \bar{a} . \bar{c}$; $|\bar{b} - \bar{a}| = 3$; $|\bar{c} - \bar{b}| = 4$ then the angle between the medians $\vec{AM}$ & $\vec{BD}$ is

(A) $\pi - \cos^{-1}\left(\frac{1}{5\sqrt{13}}\right)$ (B) $\pi - \cos^{-1}\left(\frac{1}{13\sqrt{5}}\right)$

(C) $\cos^{-1}\left(\frac{1}{5\sqrt{13}}\right)$ (D) $\cos^{-1}\left(\frac{1}{13\sqrt{5}}\right)$

Q.3 If A (– 4, 0, 3) ; B (14, 2, –5) then which one of the following points lie on the bisector of the angle between $\overrightarrow{OA}$ and $\overrightarrow{OB}$ ('O' is the origin of reference)

(A) (2, 1, –1) (B) (2, 11, 5) (C) (10, 2, –2) (D) (1, 1, 2)

Q.4 Position vectors of the four angular points of a tetrahedron ABCD are A(3, – 2, 1); B(3, 1, 5); C(4, 0, 3) and D(1, 0, 0). Acute angle between the plane faces ADC and ABC is

(A) $\tan^{-1}(5/2)$ (B) $\cos^{-1}(2/5)$ (C) $\text{cosec}^{-1}(5/2)$ (D) $\cot^{-1}(3/2)$

Q.5 The volume of the tetrahedron formed by the coterminus edges $\vec{a}, \vec{b}, \vec{c}$ is 3. Then the volume of the parallelepiped formed by the coterminus edges $\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}$ is

(A) 6 (B) 18 (C) 36 (D) 9

Q.6 Given unit vectors $\vec{m}$, $\vec{n}$ & $\vec{p}$ such that angle between $\vec{m}$ & $\vec{n}$ = angle between $\vec{p}$ and $(\vec{m} \times \vec{n}) = \pi/6$ then $[\vec{n}\ \vec{p}\ \vec{m}] =$

(A) $\sqrt{3}/4$ (B) 3/4 (C) 1/4 (D) none

Q.7 $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three vectors having magnitudes 1, 1 and 2 respectively. If $\vec{a}$ x ($\vec{a}$ x $\vec{c}$) + $\vec{b}$ = 0, then the acute angle between $\vec{a}$ & $\vec{c}$ is :

(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/3$ (D) $5\pi/12$

Q.8 If $\vec{a} = \hat{i} + \hat{j} + \hat{k}, \vec{b} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{c} = \hat{i} + \alpha\hat{j} + \beta\hat{k}$ are linearly dependent vectors & $|\vec{c}| = \sqrt{3}$, then

(A) $\alpha = 1, \beta = -1$ (B) $\alpha = 1, \beta = \pm 1$ (C) $\alpha = -1, \beta = \pm 1$ (D) $\alpha = \pm 1, \beta = 1$

Q.9 A vector of magnitude $5\sqrt{5}$ coplanar with vectors $\hat{i}+2\hat{j}$ & $\hat{j}+2\hat{k}$ and the perpendicular vector $2\hat{i}+\hat{j}+2\hat{k}$ is

(A) $\pm 5\ (5\hat{i} + 6\hat{j} - 8\hat{k})$ (B) $\pm \sqrt{5}\ (5\hat{i}+6\hat{j}-8\hat{k})$

(C) $\pm 5\sqrt{5}\ (5\hat{i} + 6\hat{j} - 8\hat{k})$ (D) $\pm (5\hat{i}+6\hat{j}-8\hat{k})$

Paragraph for questions nos. 10 to 12

Consider three vectors $\vec{p} = \hat{i} + \hat{j} + \hat{k}$, $\vec{q} = 2\hat{i} + 4\hat{j} - \hat{k}$ and $\vec{r} = \hat{i} + \hat{j} + 3\hat{k}$ and let $\vec{s}$ be a unit vector, then

Q.10 $\vec{p}$, $\vec{q}$ and $\vec{r}$ are

(A) linearly dependent

(B) can form the sides of a possible triangle

(C) such that the vectors $(\vec{q} - \vec{r})$ is orthogonal to $\vec{p}$

(D) such that each one of these can be expressed as a linear combination of the other two

Q.11 if $(\vec{p} \times \vec{q}) \times \vec{r} = u\vec{p} + v\vec{q} + w\vec{r}$, then $(u + v + w)$ equals to

(A) 8 (B) 2 (C) – 2 (D) 4

Q.12 the magnitude of the vector $(\vec{p} \cdot \vec{s})(\vec{q} \times \vec{r}) + (\vec{q} \cdot \vec{s})(\vec{r} \times \vec{p}) + (\vec{r} \cdot \vec{s})(\vec{p} \times \vec{q})$ is

(A) 4 (B) 8 (C) 18 (D) 2

One or more than one is/are correct:

Q.13 Given the following information about the non zero vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$

(i) $(\vec{A} \times \vec{B}) \times \vec{A} = \vec{0}$ (ii) $\vec{B} \cdot \vec{B} = 4$

(iii) $\vec{A} \cdot \vec{B} = -6$ (iv) $\vec{B} \cdot \vec{C} = 6$

Which one of the following holds good?

(A) $\vec{A} \times \vec{B} = \vec{0}$ (B) $\vec{A} \cdot (\vec{B} \times \vec{C}) = 0$ (C) $\vec{A} \cdot \vec{A} = 8$ (D) $\vec{A} \cdot \vec{C} = -9$

Q.14 Let $\vec{a}, \vec{b}, \vec{c}$ are non zero vectors and $\vec{V}_1 = \vec{a} \times (\vec{b} \times \vec{c})$ and $\vec{V}_2 = (\vec{a} \times \vec{b}) \times \vec{c}$. If $\vec{V}_1 = \vec{V}_2$ then which of the following hold(s) good?

(A) $\vec{a}$ and $\vec{b}$ are orthogonal (B) $\vec{a}$ and $\vec{c}$ are collinear

(C) $\vec{b}$ and $\vec{c}$ are orthogonal (D) $\vec{b} = \lambda(\vec{a} \times \vec{c})$ when λ is a scalar.

Q.15 If $\vec{A}, \vec{B}, \vec{C}$ and $\vec{D}$ are four non zero vectors in the same plane no two of which are collinear then which of the following hold(s) good?

(A) $(\vec{A} \times \vec{B}) \cdot (\vec{C} \times \vec{D}) = 0$ (B) $(\vec{A} \times \vec{C}) \cdot (\vec{B} \times \vec{D}) \neq 0$

(C) $(\vec{A} \times \vec{B}) \times (\vec{C} \times \vec{D}) = \vec{0}$ (D) $(\vec{A} \times \vec{C}) \times (\vec{B} \times \vec{D}) \neq \vec{0}$

DPP-8

Q.1 Consider three vectors $\vec{p} = \hat{i} + \hat{j} + \hat{k}$, $\vec{q} = 2\hat{i} + 4\hat{j} - \hat{k}$ and $\vec{r} = \hat{i} + \hat{j} + 3\hat{k}$. If $\vec{p}$, $\vec{q}$ and $\vec{r}$ denotes the position vector of three non-collinear points then the equation of the plane containing these points is
(A) $2x - 3y + 1 = 0$ (B) $x - 3y + 2z = 0$
(C) $3x - y + z - 3 = 0$ (D) $3x - y - 2 = 0$

Q.2 The intercept made by the plane $\vec{r}.\vec{n} = q$ on the x-axis is
(A) $\frac{q}{\hat{i}.\vec{n}}$ (B) $\frac{\hat{i}.\vec{n}}{q}$ (C) $(\hat{i}.\vec{n})q$ (D) $\frac{q}{|\vec{n}|}$

Q.3 If the distance between the planes
$8x + 12y - 14z = 2$
and $4x + 6y - 7z = 2$
can be expressed in the form $\frac{1}{\sqrt{N}}$ where N is natural then the value of $\frac{N(N+1)}{2}$ is
(A) 4950 (B) 5050 (C) 5150 (D) 5151

Q.4 A plane passes through the point P(4, 0, 0) and Q(0, 0, 4) and is parallel to the y-axis. The distance of the plane from the origin is
(A) 2 (B) 4 (C) $\sqrt{2}$ (D) $2\sqrt{2}$

Q.5 If from the point P (f, g, h) perpendiculars PL, PM be drawn to yz and zx planes then the equation to the plane OLM is
(A) $\frac{x}{f} + \frac{y}{g} - \frac{z}{h} = 0$ (B) $\frac{x}{f} + \frac{y}{g} + \frac{z}{h} = 0$ (C) $\frac{x}{f} - \frac{y}{g} + \frac{z}{h} = 0$ (D) $-\frac{x}{f} + \frac{y}{g} + \frac{z}{h} = 0$

Q.6 If the plane $2x - 3y + 6z - 11 = 0$ makes an angle $\sin^{-1}(k)$ with x-axis, then k is equal to
(A) $\sqrt{3}/2$ (B) 2/7 (C) $\sqrt{2}/3$ (D) 1

Q.7 The plane XOZ divides the join of (1, –1, 5) and (2, 3, 4) in the ratio $\lambda : 1$, then λ is
(A) – 3 (B) – 1/3 (C) 3 (D) 1/3

Q.8 A variable plane forms a tetrahedron of constant volume $64 K^3$ with the coordinate planes and the origin, then locus of the centroid of the tetrahedron is
(A) $x^3 + y^3 + z^3 = 6K^3$ (B) $xyz = 6k^3$
(C) $x^2 + y^2 + z^2 = 4K^2$ (D) $x^{-2} + y^{-2} + z^{-2} = 4K^{-2}$

Q.9 Let ABCD be a tetrahedron such that the edges AB, AC and AD are mutually perpendicular. Let the area of triangles ABC, ACD and ADB be 3, 4 and 5 sq. units respectively. Then the area of the triangle BCD, is
(A) $5\sqrt{2}$ (B) 5 (C) $5/\sqrt{2}$ (D) 5/2

Q.10 Equation of the line which passes through the point with p. v. (2, 1, 0) and perpendicular to the plane containing the vectors $\hat{i}+\hat{j}$ and $\hat{j}+\hat{k}$ is

(A) $\vec{r} = (2, 1, 0) + t\,(1, -1, 1)$ (B) $\vec{r} = (2, 1, 0) + t\,(-1, 1, 1)$

(C) $\vec{r} = (2, 1, 0) + t\,(1, 1, -1)$ (D) $\vec{r} = (2, 1, 0) + t\,(1, 1, 1)$

where t is a parameter

Q.11 Which of the following planes are parallel but not identical?

$P_1 : 4x - 2y + 6z = 3$

$P_2 : 4x - 2y - 2z = 6$

$P_3 : -6x + 3y - 9z = 5$

$P_4 : 2x - y - z = 3$

(A) P_2 & P_3 (B) P_2 & P_4 (C) P_1 & P_3 (D) P_1 & P_4

Q.12 A parallelopiped is formed by planes drawn through the points (1, 2, 3) and (9, 8, 5) parallel to the coordinate planes then which of the following is not the length of an edge of this rectangular parallelopiped

(A) 2 (B) 4 (C) 6 (D) 8

Q.13 Vector equation of the plane $\vec{r} = \hat{i} - \hat{j} + \lambda(\hat{i} + \hat{j} + \hat{k}) + \mu(\hat{i} - 2\hat{j} + 3\hat{k})$ in the scalar dot product form is

(A) $\vec{r}.(5\hat{i} - 2\hat{j} + 3\hat{k}) = 7$ (B) $\vec{r}.(5\hat{i} + 2\hat{j} - 3\hat{k}) = 7$

(C) $\vec{r}.(5\hat{i} - 2\hat{j} - 3\hat{k}) = 7$ (D) $\vec{r}.(5\hat{i} + 2\hat{j} + 3\hat{k}) = 7$

Q.14 The vector equations of the two lines L_1 and L_2 are given by

$L_1 : \vec{r} = 2\hat{i} + 9\hat{j} + 13\hat{k} + \lambda(\hat{i} + 2\hat{j} + 3\hat{k})$; $L_2 : \vec{r} = -3\hat{i} + 7\hat{j} + p\hat{k} + \mu(-\hat{i} + 2\hat{j} - 3\hat{k})$

then the lines L_1 and L_2 are

(A) skew lines for all $p \in R$

(B) intersecting for all $p \in R$ and the point of intersection is (–1, 3, 4)

(C) intersecting lines for $p = -2$

(D) intersecting for all real $p \in R$

Q.15 Consider the plane $(x, y, z) = (0, 1, 1) + \lambda(1, -1, 1) + \mu(2, -1, 0)$. The distance of this plane from the origin is

(A) 1/3 (B) $\sqrt{3}/2$ (C) $\sqrt{3/2}$ (D) $2/\sqrt{3}$

DPP-9

Q.1 The value of 'a' for which the lines $\frac{x-2}{1}=\frac{y-9}{2}=\frac{z-13}{3}$ and $\frac{x-a}{-1}=\frac{y-7}{2}=\frac{z+2}{-3}$ intersect, is

(A) – 5 (B) – 2 (C) 5 (D) – 3

Q.2 Given A (1, –1, 0) ; B(3, 1, 2) ; C(2, –2, 4) and D(–1, 1, –1) which of the following points neither lie on AB nor on CD?

(A) (2, 2, 4) (B) (2, –2, 4) (C) (2, 0,1) (D) (0, –2, –1)

Q.3 For the line $\frac{x-1}{1}=\frac{y-2}{2}=\frac{z-3}{3}$, which one of the following is incorrect?

(A) it lies in the plane $x-2y+z=0$
(B) it is same as line $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$
(C) it passes through (2, 3, 5)
(D) it is parallel to the plane $x-2y+z-6=0$

Q.4 Given planes

$P_1 : cy + bz = x$
$P_2 : az + cx = y$
$P_3 : bx + ay = z$

P_1, P_2 and P_3 pass through one line, if

(A) $a^2 + b^2 + c^2 = ab + bc + ca$
(B) $a^2 + b^2 + c^2 + 2abc = 1$
(C) $a^2 + b^2 + c^2 = 1$
(D) $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca + 2abc = 1$

Q.5 The line $\frac{x-x_1}{0}=\frac{y-y_1}{1}=\frac{z-z_1}{2}$ is

(A) parallel to x-axis
(B) perpendicular to x-axis
(C) perpendicular to YOZ plane
(D) parallel to y-axis

Q.6 The lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ are coplanar if

(A) k = 0 or – 1 (B) k = 1 or – 1 (C) k = 0 or – 3 (D) k = 3 or – 3

Q.7 The line $\frac{x-2}{3}=\frac{y+1}{2}=\frac{z-1}{-1}$ intersects the curve $xy=c^2$, in xy plane if c is equal to

(A) ± 1 (B) ± 1/3 (C) $\pm\sqrt{5}$ (D) none

Q.8 The line which contains all points (x, y, z) which are of the form (x, y, z) = (2, –2, 5) + λ(1, –3, 2) intersects the plane $2x-3y+4z=163$ at P and intersects the YZ plane at Q. If the distance PQ is $a\sqrt{b}$ where $a, b \in N$ and $a > 3$ then (a + b) equals

(A) 23 (B) 95 (C) 27 (D) none

Q.9 Let L_1 be the line $\vec{r}_1 = 2\hat{i}+\hat{j}-\hat{k}+\lambda(\hat{i}+2\hat{k})$ and let L_2 be the line $\vec{r}_2 = 3\hat{i}+\hat{j}+\mu(\hat{i}+\hat{j}-\hat{k})$.
Let Π be the plane which contains the line L_1 and is parallel to L_2. The distance of the plane Π from the origin is

(A) 1/7 (B) $\sqrt{2/7}$ (C) $\sqrt{6}$ (D) none

Q.10 The value of m for which straight line $3x-2y+z+3=0=4x-3y+4z+1$ is parallel to the plane $2x-y+mz-2=0$ is

(A) –2 (B) 8 (C) – 18 (D) 11

Q.11 A straight line is given by $\vec{r} = (1+t)\hat{i} + 3t\hat{j} + (1-t)\hat{k}$ where $t \in R$. If this line lies in the plane $x + y + cz = d$ then the value of $(c + d)$ is

(A) – 1 (B) 1 (C) 7 (D) 9

Q.12 The distance of the point $(-1, -5, -10)$ from the point of intersection of the line $\frac{x-2}{2} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane $x - y + z = 5$ is

(A) $2\sqrt{11}$ (B) $\sqrt{126}$ (C) 13 (D) 14

Q.13 $P(\vec{p})$ and $Q(\vec{q})$ are the position vectors of two fixed points and $R(\vec{r})$ is the position vector of a variable point. If R moves such that $(\vec{r} - \vec{p}) \times (\vec{r} - \vec{q}) = 0$ then the locus of R is

(A) a plane containing the origin 'O' and parallel to two non collinear vectors $\overrightarrow{OP}$ and $\overrightarrow{OQ}$

(B) the surface of a sphere described on PQ as its diameter.

(C) a line passing through the points P and Q

(D) a set of lines parallel to the line PQ.

MATCH THE COLUMN:

Q.14 Consider the following four pairs of lines in **column-I** and match them with one or more entries in **column-II**.

	Column-I		Column-II
(A)	$L_1 : x = 1 + t,\ y = t,\ z = 2 - 5t$ $L_2 : \vec{r} = (2, 1, -3) + \lambda(2, 2, -10)$	(P)	non coplanar lines
(B)	$L_1 : \frac{x-1}{2} = \frac{y-3}{2} = \frac{z-2}{-1}$ $L_2 : \frac{x-2}{1} = \frac{y-6}{-1} = \frac{z+2}{3}$	(Q)	lines lie in a unique plane
(C)	$L_1 : x = -6t,\ y = 1 + 9t,\ z = -3t$ $L_2 : x = 1 + 2s,\ y = 4 - 3s,\ z = s$	(R)	infinite planes containing both the lines
(D)	$L_1 : \frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ $L_2 : \frac{x-3}{-4} = \frac{y-2}{-3} = \frac{z-1}{2}$	(S)	lines are not intersecting

Q.15 $P(0, 3, -2)$; $Q(3, 7, -1)$ and $R(1, -3, -1)$ are 3 given points. Let L_1 be the line passing through P and Q and L_2 be the line through R and parallel to the vector $\vec{V} = \hat{i} + \hat{k}$.

	Column-I		Column-II
(A)	perpendicular distance of P from L_2	(P)	$7\sqrt{3}$
(B)	shortest distance between L_1 and L_2	(Q)	2
(C)	area of the triangle PQR	(R)	6
(D)	distance from (0, 0, 0) to the plane PQR	(S)	$\frac{19}{\sqrt{147}}$

DPP-10

Q.1 If $\vec{a}, \vec{b}, \vec{c}$ are three non-coplanar & $\vec{p}, \vec{q}, \vec{r}$ are reciprocal vectors to $\vec{a}$, $\vec{b}$ & $\vec{c}$ respectively, then

$(\ell\vec{a} + m\vec{b} + n\vec{c}) \cdot (\ell\vec{p} + m\vec{q} + n\vec{r})$ is equal to : (where l, m, n are scalars)

(A) $l^2 + m^2 + n^2$ (B) $lm + mn + nl$ (C) 0 (D) none of these

Q.2 If $\vec{A}, \vec{B}$ & $\vec{C}$ are three non-coplanar vectors, then $(\vec{A}+\vec{B}+\vec{C}) \cdot [(\vec{A}+\vec{B}) \times (\vec{A}+\vec{C})]$ equals

(A) 0 (B) $[\vec{A}\,\vec{B}\,\vec{C}]$ (C) 2 $[\vec{A}\,\vec{B}\,\vec{C}]$ (D) $-$ $[\vec{A}\,\vec{B}\,\vec{C}]$

Q.3 A plane P_1 has the equation $2x - y + z = 4$ and the plane P_2 has the equation $x + ny + 2z = 11$. If the angle between P_1 and P_2 is $\frac{\pi}{3}$ then the value(s) of 'n' is (are)

(A) 7/2 (B) 17, –1 (C) –17, 1 (D) – 7/2

Q.4 The three vectors $\hat{i} + \hat{j}$, $\hat{j} + \hat{k}$, $\hat{k} + \hat{i}$ taken two at a time form three planes. The three unit vectors drawn perpendicular to these three planes form a parallelopiped of volume :

(A) 1/3 (B) 4 (C) $3\sqrt{3}/4$ (D) $4/3\sqrt{3}$

Q.5 If $\vec{x}$ & $\vec{y}$ are two non collinear vectors and a, b, c represent the sides of a Δ ABC satisfying $(a-b)\vec{x} + (b-c)\vec{y} + (c-a)(\vec{x} \times \vec{y}) = 0$ then Δ ABC is

(A) an acute angle triangle (B) an obtuse angle triangle
(C) a right angle triangle (D) a scalene triangle

Q.6 Given three non – zero, non – coplanar vectors $\vec{a}, \vec{b}, \vec{c}$ and $\vec{r}_1 = p\vec{a} + q\vec{b} + \vec{c}$ and $\vec{r}_2 = \vec{a} + p\vec{b} + q\vec{c}$ if the vectors $\vec{r}_1 + 2\vec{r}_2$ and $2\vec{r}_1 + \vec{r}_2$ are collinear then (p, q) is

(A) (0, 0) (B) (1, –1) (C) (–1, 1) (D) (1, 1)

Q.7 If the vectors $\vec{a}$, $\vec{b}$, $\vec{c}$ are non-coplanar and l, m, n are distinct scalars, then

$\left[\left(\ell\vec{a} + m\vec{b} + n\vec{c}\right)\left(\ell\vec{b} + m\vec{c} + n\vec{a}\right)\left(\ell\vec{c} + m\vec{a} + n\vec{b}\right)\right] = 0$ implies :

(A) $lm + mn + nl = 0$ (B) $l + m + n = 0$
(C) $l^2 + m^2 + n^2 = 0$ (D) $l^3 + m^3 + n^3 = 0$

Q.8 Let $\vec{r}_1, \vec{r}_2, \vec{r}_3........\vec{r}_n$ be the position vectors of points $P_1, P_2, P_3,.....P_n$ relative to the origin O. If the vector equation $a_1\vec{r}_1 + a_2\vec{r}_2 + ... + a_n\vec{r}_n = 0$ holds, then a similar equation will also hold w.r.t. to any other origin provided

(A) $a_1 + a_2 + ... + a_n = n$ (B) $a_1 + a_2 + ... + a_n = 1$
(C) $a_1 + a_2 + ... + a_n = 0$ (D) none

Q.9 The orthogonal projection A' of the point A with position vector (1, 2, 3) on the plane $3x - y + 4z = 0$ is

(A) (–1, 3, –1) (B) $\left(-\frac{1}{2}, \frac{5}{2}, 1\right)$ (C) $\left(\frac{1}{2}, -\frac{5}{2}, -1\right)$ (D) (6, –7, –5)

Paragraph for Question Nos. 10 to 11

Consider a plane

$x + y - z = 1$ and the point $A(1, 2, -3)$

A line L has the equation

$x = 1 + 3r$

$y = 2 - r$

$z = 3 + 4r$

Q.10 The co-ordinate of a point B of line L, such that AB is parallel to the plane, is

(A) 10, –1, 15 (B) –5, 4, –5 (C) 4, 1, 7 (D) –8, 5, –9

Q.11 Equation of the plane containing the line L and the point A has the equation

(A) $x - 3y + 5 = 0$ (B) $x + 3y - 7 = 0$ (C) $3x - y - 1 = 0$ (D) $3x + y - 5 = 0$

Paragraph for Question Nos. 12 to 15

Consider a triangular pyramid ABCD the position vectors of whose angular points are A(3, 0, 1) ; B(–1, 4, 1); C(5, 2, 3) and D(0, –5, 4). Let G be the point of intersection of the medians of the triangle BCD.

Q.12 The length of the vector $\overrightarrow{AG}$ is

(A) $\sqrt{17}$ (B) $\sqrt{51}/3$ (C) $\sqrt{51}/9$ (D) $\sqrt{59}/4$

Q.13 Area of the triangle ABC in sq. units is

(A) 24 (B) $8\sqrt{6}$ (C) $4\sqrt{6}$ (D) none

Q.14 The length of the perpendicular from the vertex D on the opposite face is

(A) $14/\sqrt{6}$ (B) $2/\sqrt{6}$ (C) $3/\sqrt{6}$ (D) none

Q.15 Equation of the plane ABC is

(A) $x + y + 2z = 5$ (B) $x - y - 2z = 1$ (C) $2x + y - 2z = 4$ (D) $x + y - 2z = 1$

Paragraph for Question Nos. 16 to 18

The equation of line: $\frac{x-x'}{a'} = \frac{y-y'}{b'} = \frac{z-z'}{c'}$

The equation of plane : $a(x - x_1) + b(y - y_1) + c(z - z_1) = 0$

Equation of plane through the intersection of the two planes

$a_1x + b_1y + c_1z + d_1 = 0$ and $a_2x + b_2y + c_2z + d_2 = 0$:

$(a_1x + b_1y + c_1z + d_1) + k(a_2x + b_2y + c_2z + d_2) = 0$

Q.16 The distance of the point (1, – 2, 3) from the plane $x - y + z = 5$ measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z-3}{-4}$ is

(A) $\sqrt{21}/5$ (B) $\sqrt{29}/5$ (C) $\sqrt{13}/5$ (D) $2/\sqrt{5}$

Q.17 The equation of the plane through (0, 2, 4) and containing the line $\frac{x+3}{3} = \frac{y-1}{4} = \frac{z-2}{-2}$ is

(A) $x - 2y + 4z - 12 = 0$ (B) $5x + y + 9z - 38 = 0$

(C) $10x - 12y - 9z + 60 = 0$ (D) $7x + 5y - 3z + 2 = 0$

Q.18 The plane $x - y - z = 2$ is rotated through 90° about its line of intersection with the plane $x + 2y + z = 2$. Then equation of this plane in new position is

(A) $5x + 4y + z - 10 = 0$ (B) $4x + 5y - 3z = 0$

(C) $2x + y + 2z = 9$ (D) $3x + 4y - 5z = 9$

Paragraph for Question Nos. 19 to 21

Consider the three vectors $\vec{p}, \vec{q}$ and $\vec{r}$ such that

$$\vec{p} = \hat{i} + \hat{j} + \hat{k}\,; \quad \vec{q} = \hat{i} - \hat{j} + \hat{k}$$
$$\vec{p} \times \vec{r} = \vec{q} + c\vec{p} \text{ and } \vec{p} \cdot \vec{r} = 2$$

Q.19 The value of $[\vec{p}\ \vec{q}\ \vec{r}]$ is

(A) $-\dfrac{5\sqrt{2}c}{|\vec{r}|}$ (B) $-\dfrac{8}{3}$ (C) 0 (D) greater then zero

Q.20 If $\vec{x}$ is a vector such that $[\vec{p}\,\vec{q}\,\vec{r}]\,\vec{x} = (\vec{p} \times \vec{q}) \times \vec{r}$, then $\vec{x}$ is

(A) $c\,(\hat{i} - 2\hat{j} + \hat{k})$

(B) a unit vector

(C) indeterminate, as $[\vec{p}\,\vec{q}\,\vec{r}]$

(D) $-\dfrac{1}{2}\,(\hat{i} - 2\hat{j} + \hat{k})$

Q.21 If $\vec{y}$ is a vector satisfying $(1 + c)\,\vec{y} = \vec{p} \times (\vec{q} \times \vec{r})$ then the vectors $\vec{x}, \vec{y}, \vec{r}$

(A) are collinear

(B) are coplanar

(C) represent the coterminus edges of a tetrahedron whose volume is c cubic units.

(D) represent the coterminus edges of a parallelepiped whose volume is c cubic units

[REASONING TYPE]

Q.22 Given lines $\dfrac{x-4}{2} = \dfrac{y+5}{4} = \dfrac{z-1}{-3}$ and $\dfrac{x-2}{1} = \dfrac{y+1}{3} = \dfrac{z}{2}$

Statement-1: The lines intersect.

because

Statement-2: They are not parallel.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

Q.23 Consider three vectors $\vec{a}, \vec{b}$ and $\vec{c}$

Statement-1: $\vec{a} \times \vec{b} = \left((\hat{i} \times \vec{a}) \cdot \vec{b}\right)\hat{i} + \left((\hat{j} \times \vec{a}) \cdot \vec{b}\right)\hat{j} + \left((\hat{k} \times \vec{a}) \cdot \vec{b}\right)\hat{k}$

because

Statement-2: $\vec{c} = (\hat{i} \cdot \vec{c})\,\hat{i} + (\hat{j} \cdot \vec{c})\,\hat{j} + (\hat{k} \cdot \vec{c})\,\hat{k}$

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

[MULTIPLE OBJECTIVE TYPE]

Select the correct alternative(s): (More than one are correct)

Q.24 If $A(\bar{a}); B(\bar{b}); C(\bar{c})$ and $D(\bar{d})$ are four points such that

$\bar{a} = -2\hat{i} + 4\hat{j} + 3\hat{k}$; $\bar{b} = 2\hat{i} - 8\hat{j}$; $\bar{c} = \hat{i} - 3\hat{j} + 5\hat{k}$; $\bar{d} = 4\hat{i} + \hat{j} - 7\hat{k}$

d is the shortest distance between the lines AB and CD, then which of the following is True?

(A) d = 0, hence AB and CD intersect

(B) $d = \dfrac{[\overrightarrow{AB}\ \overrightarrow{CD}\ \overrightarrow{BD}]}{|\overrightarrow{AB} \times \overrightarrow{CD}|}$

(C) AB and CD are skew lines and $d = \dfrac{23}{13}$

(D) $d = \dfrac{[\overrightarrow{AB}\ \overrightarrow{CD}\ \overrightarrow{AC}]}{|\overrightarrow{AB} \times \overrightarrow{CD}|}$

Q.25 Consider four points $A(\bar{a})$; $B(\bar{b})$; $C(\bar{c})$ and $D(\bar{d})$, such that

$\overline{GA} + \overline{GB} + \overline{GC} + \overline{GD} = \bar{0}$ for a point $G(\bar{g})$, if

(A) G is the centroid of the tetrahedron ABCD

(B) G lies on the line joining each of A, B, C, D to the centroid of the triangle formed by the other three

(C) p.v. of G is collinear with the p.v. of the centroids of the triangle formed by any three of the four given points.

(D) $\square$ABCD is parallelogram with G as the point of intersection of the diagonals AC and BD.

Q.26 Given the equations of the line $3x - y + z + 1 = 0$, $5x + y + 3z = 0$.
Then which of the following is correct ?

(A) symmetical form of the equations of line is $\dfrac{x}{2} = \dfrac{y - \frac{1}{8}}{-1} = \dfrac{z + \frac{5}{8}}{1}$

(B) symmetrical form of the equations of line is $\dfrac{x + \frac{1}{8}}{1} = \dfrac{y - \frac{5}{8}}{1} = \dfrac{z}{-2}$

(C) equation of the plane through (2, 1, 4) and prependicular to the given lines is $2x - y + z - 7 = 0$

(D) equation of the plane through (2, 1, 4) and prependicular to the given lines is $x + y - 2z + 5 = 0$

Q.27 Given three vectors

$\vec{U} = 2\hat{i} + 3\hat{j} - 6\hat{k}$; $\vec{V} = 6\hat{i} + 2\hat{j} + 3\hat{k}$; $\vec{W} = 3\hat{i} - 6\hat{j} - 2\hat{k}$

Which of the following hold good for the vectors $\vec{U}$, $\vec{V}$ and $\vec{W}$?

(A) $\vec{U}$, $\vec{V}$ and $\vec{W}$ are linearly depedent

(B) $(\vec{U} \times \vec{V}) \times \vec{W} = \vec{0}$

(C) $\vec{U}$, $\vec{V}$ and $\vec{W}$ form a triplet of mutually perpendicular vectors

(D) $\vec{U} \times (\vec{V} \times \vec{W}) = \vec{0}$

Q.28 Consider the family of planes $x + y + z = c$ where c is a parameter intersecting the coordinate axes at P, Q, R and α, β, γ are the angles made by each member of this family with positive x, y and z axis. Which of the following interpretations hold good for this family.

(A) each member of this family is equally inclined with the coordinate axes.

(B) $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 1$

(C) $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 2$

(D) for c = 3 area of the triangle PQR is $3\sqrt{3}$ sq. units.

[MATCH THE COLUMN]

Q.29

	Column-I		Column-II
(A)	*Centre of the parallelopiped whose 3 coterminous edges* $\overrightarrow{OA}, \overrightarrow{OB}$ *and* $\overrightarrow{OC}$ *have position vectors* $\vec{a}, \vec{b}$ *and* $\vec{c}$ *respectively where O is the origin, is*	(P)	$\vec{a}+\vec{b}+\vec{c}$
(B)	*OABC is a tetrahedron where O is the origin. Positions vectors of its angular points A, B and C are* $\vec{a}, \vec{b}$ *and* $\vec{c}$ *respectively. Segments joining each vertex with the centroid of the opposite face are concurrent at a point P whose p.v.'s are*	(Q)	$\frac{\vec{a}+\vec{b}+\vec{c}}{3}$
(C)	*Let ABC be a triangle the position vectors of its angular points are* $\vec{a}, \vec{b}$ *and* $\vec{c}$ *respectively. If* $\|\vec{a}-\vec{b}\|=\|\vec{b}-\vec{c}\|=\|\vec{c}-\vec{a}\|$ *then the p.v. of the orthocentre of the triangle is*	(R)	$\frac{\vec{a}+\vec{b}+\vec{c}}{4}$
(D)	*Let* $\vec{a}, \vec{b}, \vec{c}$ *be 3 mutually perpendicular vectors of the same magnitude. If an unknown vector* $\vec{x}$ *satisfies the equation* $\vec{a}\times\left((\vec{x}-\vec{b})\times\vec{a}\right)+\vec{b}\times\left((\vec{x}-\vec{c})\times\vec{b}\right)+\vec{c}\times\left((\vec{x}-\vec{a})\times\vec{c}\right)=0.$ *Then* $\vec{x}$ *is given by*	(S)	$\frac{\vec{a}+\vec{b}+\vec{c}}{2}$

Q.30

	Column-I		Column-II
(A)	Let O be an interior point of ΔABC such that $\overrightarrow{OA}+2\overrightarrow{OB}+3\overrightarrow{OC}=\vec{0}$, then the ratio of the area of Δ ABC to the area of ΔAOC, is with O is the origin	(P)	0
(B)	Let ABC be a triangle whose centroid is G, orthocentre is H and circumcentre is the origin 'O'. If D is any point in the plane of the triangle such that no three of O, A, B, C and D are collinear satisfying the relation $\overrightarrow{AD}+\overrightarrow{BD}+\overrightarrow{CH}+3\overrightarrow{HG}=\lambda\overrightarrow{HD}$ then the value of the scalar 'λ' is	(Q)	1
		(R)	2
		(S)	3
(C)	If $\vec{a}, \vec{b}, \vec{c}$ and $\vec{d}$ are non zero vectors such that no three of them are in the same plane and no two are orthogonal then the value of the scalar $\frac{(\vec{b}\times\vec{c})\cdot(\vec{a}\times\vec{d})+(\vec{c}\times\vec{a})\cdot(\vec{b}\times\vec{d})}{(\vec{a}\times\vec{b})\cdot(\vec{d}\times\vec{c})}$ is		

[SUBJECTIVE TYPE]

Q.31 If the lattice point P(x, y, z), x, y, z $\in$ I with the largest value of z such that the P lies on the planes $7x + 6y + 2z = 272$ and $x - y + z = 16$ (given x, y, z > 0), find the value of $(x + y + z)$.

Q.32 Given $\vec{A} = 2\hat{i}+3\hat{j}+6\hat{k}$, $\vec{B}=\hat{i}+\hat{j}-2\hat{k}$ and $\vec{C}=\hat{i}+2\hat{j}+\hat{k}$.

Compute the value of $\left|\vec{A}\times\left(\vec{A}\times(\vec{A}\times\vec{B})\right)\cdot\vec{C}\right|$.

ANSWER KEY

DPP-1

Q.1 B	Q.2 A	Q.3 D	Q.4 A	Q.5 B
Q.6 B	Q.7 D	Q.8 B	Q.9 D	Q.10 A
Q.11 A	Q.12 C			

DPP-2

Q.1 B	Q.2 D	Q.3 C	Q.4 A	Q.5 D
Q.6 B	Q.7 C	Q.8 D	Q.9 C	Q.10 A

DPP-3

Q.1 D	Q.2 B	Q.3 D	Q.4 A	Q.5 D
Q.6 B	Q.7 C	Q.8 B	Q.9 B	Q.10 D
Q.11 A	Q.12 A			

DPP-4

Q.1 A	Q.2 B	Q.3 C	Q.4 A	Q.5 A
Q.6 B	Q.7 A	Q.8 C	Q.9 B	Q.10 C
Q.11 D	Q.12 A			

DPP-5

Q.1 B	Q.2 C	Q.3 B	Q.4 C	Q.5 B
Q.6 D	Q.7 D	Q.8 C	Q.9 B	Q.10 C
Q.11 A				

DPP-6

Q.1 D	Q.2 B	Q.3 A	Q.4 D	Q.5 A
Q.6 B	Q.7 C	Q.8 C	Q.9 A	Q.10 D
Q.11 C	Q.12 A	Q.13 D	Q.14 B	Q.15 A, C

DPP-7

Q.1 C	Q.2 A	Q.3 D	Q.4 A	Q.5 C
Q.6 A	Q.7 A	Q.8 D	Q.9 D	Q.10 C
Q.11 B	Q.12 A	Q.13 A, B, D	Q.14 B, D	Q.15 B, C

DPP-8

Q.1 D	Q.2 A	Q.3 D	Q.4 D	Q.5 A
Q.6 B	Q.7 D	Q.8 B	Q.9 A	Q.10 A
Q.11 C	Q.12 B	Q.13 C	Q.14 C	Q.15 C

DPP-9

Q.1 D	Q.2 A	Q.3 C	Q.4 B	Q.5 B
Q.6 C	Q.7 C	Q.8 A	Q.9 B	Q.10 A
Q.11 D	Q.12 C	Q.13 C		

Q.14 (A) R, (B) Q, (C) Q, S, (D) P, S

Q.15 (A) R; (B) Q; (C) P ; (D) S

DPP-10

Q.1 A	Q.2 D	Q.3 C	Q.4 D	Q.5 A
Q.6 D	Q.7 B	Q.8 C	Q.9 B	Q.10 D
Q.11 B	Q.12 B	Q.13 C	Q.14 A	Q.15 D
Q.16 B	Q.17 C	Q.18 A	Q.19 B	Q.20 D
Q.21 C	Q.22 D	Q.23 A	Q.24 B, C, D	Q.25 A, B, D
Q.26 B, D	Q.27 B, C, D	Q.28 A, B, C	Q.29 (A) S; (B) R; (C) Q; (D) S	
Q.30 (A) S; (B) R; (C) Q		Q.31 66	Q.32 343	