VECTORS

QNo1: If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of the vertices of an equilateral triangle whose orthocenter is at the origin, then :

(a) $\vec{a}+\vec{b}+\vec{c}=\vec{0}$ (b) $\vec{a}^2=\vec{b}^2+\vec{c}^2$ (c) $\vec{a}+\vec{b}=\vec{c}$ (d) none of these

QNo2: If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a}+\vec{b}=\vec{c}$, then $\vec{b}$ is called

(a) a projection of $\vec{c}$ (b) a component of $\vec{c}$ (c) a complement $\vec{c}$ (d) none of these

QNo3: If $\vec{a}$ + (1, -1) and $\vec{b}$ = (-2, m) are collinear vectors, then m =

(a) 4 (b) 3 (c) 2 (d) 0

QNo4: If $\vec{c}$ is one unit vector $\perp$ to $\vec{a}, \vec{b}$, then the second unit vector $\perp$ to $\vec{a}, \vec{b}$ will be

(a) $\vec{a}$ (b) $\vec{a}\times\vec{b}$ (c) $-\vec{c}$ (d) none of these

QNo5: The positive vectors of three consecutive vertices A, B and C of a parallelgram ABCD are $\vec{r}_1$, $\vec{r}_2$ and $\vec{r}_3$ respectively . Then the position vector of the formula vertex D is :

(a) $\vec{r}_1+\vec{r}_2-\vec{r}_3$ (b) $\vec{r}_2+\vec{r}_3-\vec{r}_1$ (c) $\vec{r}_3+\vec{r}_1-\vec{r}_2$ (d) none of these

QNo6: Projection of the vector $\vec{a} = 2\vec{i}+3\vec{j}-2\vec{k}$ on the vector $\vec{b} = \vec{i}+2\vec{j}+3\vec{k}$ is

(a) $\frac{2}{\sqrt{14}}$ (b) $\frac{1}{\sqrt{14}}$ (c) $\frac{3}{\sqrt{14}}$ (d) none of these

QNo7: The value of $|\vec{a}\times\vec{i}|^2+|\vec{a}\times\vec{j}|^2+|\vec{a}\times\vec{k}|^2$ is :

(a) $|\vec{a}|^2$ (b) $2|\vec{a}|^2$ (c) $3|\vec{a}|^2$ (d) $4|\vec{a}|^2$

QNo8: $\vec{i}\times(\vec{x}\times\vec{i})+\vec{j}\times(\vec{x}\times\vec{j})\times\vec{k}\times(\vec{x}\times\vec{k})$ is equal to

(a) $\vec{0}$ (b) $\vec{x}$ (c) $2\vec{x}$ (d) 0

QNo9: $(\vec{a}\times\vec{b})^2$ is equal to

(a) $\vec{a}^2\,\vec{b}^2-(\vec{a}.\,\vec{b})^2$ (b) $\vec{a}^2\,\vec{b}^2+(\vec{a}.\,\vec{b})^2$ (c) $(\vec{a}.\,\vec{b})^2$ (d) $\vec{a}^2\,\vec{b}^2$

QNo10: The vector $\frac{2}{7}\vec{i}+\frac{3}{7}\vec{j}-\frac{6}{7}\vec{k}$ is

(a) a null vector (b) a unit vector (c) a vector whose components are (2, 3, -6)
(d) a vector which is equally inclined to the axes

QNo11: $\vec{a}.(\vec{a}\times\vec{b}) =$

(a) $\vec{a}.\vec{b}$ (b) ab (c) 0 (d) a^2 + ab

QNo12: $\vec{a}\times(\vec{b}\times\vec{c})+\vec{b}\times(\vec{c}\times\vec{a})+\vec{c}\times(\vec{a}\times\vec{b})$ is :

(a) 2 $(\vec{a}\,\vec{b}\,\vec{c})$ (b) $\vec{0}$ (c) $\vec{a}+\vec{b}+\vec{c}$ (d) 0

QNo13: If the vectors $3\vec{i}+\lambda\vec{j}+\vec{k}$ and $2\vec{i}+\vec{j}+8\vec{k}$ are $\perp$, then λ is equal to :

(a) -4 (b) 1 (c) 14 (d) 1/ 7

QNo14: $\vec{e}_1', \vec{e}_2', \vec{e}_3'$ are vectors reciprocals to the non- coplanar vectors $\vec{e}_1, \vec{e}_2, \vec{e}_3$, then $[\vec{e}_1', \vec{e}_2', \vec{e}_3']\ [\vec{e}_1, \vec{e}_2, \vec{e}_3]$ = then $[\vec{e}_1', \vec{e}_2', \vec{e}_3'], [\vec{e}_1, \vec{e}_2, \vec{e}_3]=$

(a) -(1 /2) (b) 1 (c) 0 (d) 4

QNo15: $\begin{vmatrix} \vec{a}.\vec{a} & \vec{a}.\vec{b} & \vec{a}.\vec{c} \\ \vec{b}.\vec{a} & \vec{b}.\vec{b} & \vec{b}.\vec{c} \\ \vec{c}.\vec{a} & \vec{c}.\vec{b} & \vec{c}.\vec{c} \end{vmatrix}$ is equal to :

(a) $[\vec{a}, \vec{b}, \vec{c}]^2$ (b) $[\vec{a}, \vec{b}, \vec{c}]$ (c) $[\vec{a}, \vec{b}, \vec{c}]^3$ (d) none of these

QNo16: If $\vec{a}, \vec{b}, \vec{c}$ are vectors such that $\vec{c} = \vec{a} + \vec{b}$ and $\vec{a}.\vec{b} = 0$, then

(a) $a^2 + b^2 + c^2 = 0$ (b) $a^2 - b^2 = 0$ (c) $c^2 = a^2 + b^2$ (d) $c^2 = \vec{a} \times \vec{b}$

QNo17: If $|\vec{a}| = 6$, $|\vec{b}| = 8$, $|\vec{a} - \vec{b}| = 10$, then $|\vec{a} + \vec{b}|$ is equal to :

(a) 10 (b) 24 (c) 40 (d) 36

QNo18: If $\vec{a}, \vec{b}, \vec{c}$ are coplanar , then $[\vec{a}+\vec{b}, \vec{b}+\vec{c}, \vec{c}+\vec{a}] =$

(a) a (b) 0 (c) b (d) a + b

QNo19: If $\vec{a}, \vec{b}, \vec{c}$ are coplanar , then $[\vec{a}\times\vec{b}, \vec{b}\times\vec{c}, \vec{c}\times\vec{a}] =$

(a) abc (b) ab (c) bc (d) 0

QNo20: The value of $(\vec{a} - \vec{b})[(\vec{b} - \vec{c}) \times (\vec{c} \times \vec{a})]$ is

(a) 0 (b) $2[\vec{a}\,\vec{b}\,\vec{c}]$ (c) $3[\vec{a}\,\vec{b}\,\vec{c}]$ (d) none of these

QNo21: The value of $(\vec{r}.\vec{i})\vec{i} + (\vec{r}.\vec{j})\vec{j} + (\vec{r}.\vec{k})\vec{k}$ is equal to :

(a) $\vec{i}$ (b) $\vec{j}$ (c) $\vec{k}$ (d) $\vec{r}$

QNo22: Let $\vec{A}$ and $\vec{B}$ be two non- parallel unit vectors in a plane. If the vectors $(\alpha \vec{A} + \vec{B})$ bisects the internal angle between $\vec{A}$ and $\vec{B}$, then α is :

(a) 1 /2 (b) 1 (c) 2 (d) 4

QNo23: Let $\vec{a}$ be a non- zero, vectors then $\frac{\vec{a}}{|\vec{a}|}$ is a

(a) null vectors (b) scalar (c) unit vector parallel to $\vec{a}$ (d) unit vector perpendicular to $\vec{a}$

QNo24: If $\vec{a}$ is a non – zero vector and K is a scalar such that $|K\vec{a}| = 1$, then K is equal to

(a) $|\vec{a}|$ (b) 1 (c) $\frac{1}{|\vec{a}|}$ (d) $+\frac{1}{|\vec{a}|}$

QNo25: Let $\vec{a} = -\vec{i} + 2\vec{j} = (-1, 2)$

$\vec{b} = 3\vec{i} - 2\vec{j} = (3, -2)$

$\vec{c} = 5\vec{j} = (0, 5)$

Then $\vec{a} + \vec{b} = -2\vec{c}$ is :

(a) $2\vec{i} + 10\vec{j}$ (b) $-2\vec{i} + 10\vec{j}$ (c) $2\vec{i} - 10\vec{j}$ (d) $3\vec{i} + 2\vec{j}$

QNo26: If $\vec{a}$ and $\vec{b}$ are position vector of A and B respectively , then the position vector of a point C in AB produced such that $\overrightarrow{AC} = 3\,\overrightarrow{AB}$ is :

(a) $3\vec{a}-\vec{b}$ (b) $3\vec{b}-\vec{a}$ (c) $3\vec{a}-2\vec{b}$ (d) $3\vec{b}-2\vec{a}$

QNo27: Let $\vec{a}$ and $\vec{b}$ be unit vectors inclined at an angle α to each other , then $\left|\vec{a}+\vec{b}\right| < 1$ if

(a) $\alpha=\frac{\pi}{2}$ (b) $\alpha<\frac{\pi}{3}$ (c) $\alpha>\frac{2\pi}{3}$ (d) $\frac{\pi}{3}<\alpha<\frac{2\pi}{3}$

QNo28: $[\vec{i}\,\vec{j}\,\vec{k}]$ is equal to :

(a) 0 (b) 1 (c) -1 (d) 3

QNo29: Given two vectors $\vec{a}=2\vec{i}-3\vec{j}+6\vec{k}, \vec{b}=-2\vec{i}+2\vec{j}-\vec{k}$ and $\lambda=\dfrac{\text{the projection of } \vec{a} \text{ on } \vec{b}}{\text{the projection of } \vec{b} \text{ on } \vec{a}}$ then the value of λ is :

(a) 3 /7 (b) 7 (c) 3 (d) 7 / 3

QNo30: Let $\vec{a}$ and $\vec{b}$ proper vectors . Then $\vec{a}$ and $\vec{b}$ are at right angles iff $\vec{a}.\vec{b}$ is equal to :

(a) 1 (b) 0 (c) – 1 (d) none of these

QNo31: (1, 0, 0) × (0, 1, 0) is equal to :

(a) (1, 1, 0) (b) 0 (c) (0, 0, 1) (d) 2

QNo32: If cross product of two non- zero vectors is zero, then the vectors are :

(a) collinear (b) co – directional (c) co – initial (d) co – terminus

QNo33: $\vec{i}.(\vec{j}\times\vec{k})+\vec{j}.(\vec{k}\times\vec{i})+\vec{k}.(\vec{i}\times\vec{j})$ is equal to :

(a) 0 (b) -3 (c) -1 (d) 3

QNo34: If $\vec{a}=\vec{i}-3\vec{j}+\vec{k}$ and $\vec{b}=\vec{i}+\vec{j}+\vec{k}$, then $\left|\vec{a}\times\vec{b}\right|$ is equal to :

(a) $4\sqrt{2}$ (b) $3\sqrt{2}$ (c) $2\sqrt{5}$ (d) $2\sqrt{3}$

QNo35: If $\vec{a},\vec{b},\vec{c}$ are any three mutually ⊥ unit vectors, then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is equal to :

(a) 1 (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) 2

QNo36: A unit vector parallel to the sum of the vectors $\vec{a}=2\vec{i}+4\vec{j}-5\vec{k}$ and $\vec{b}=\vec{i}+2\vec{j}+3\vec{k}$ is given by

(a) $3\vec{i}+6\vec{j}-2\vec{k}$ (b) $-\frac{1}{7}(3\vec{i}+6\vec{j}-2\vec{k})$ (c) $\frac{1}{7}(3\vec{i}+6\vec{j}-2\vec{k})$ (d) none of these

QNo37: If $\vec{a}=\vec{i}+\vec{j}-\vec{k}, \vec{b}=\vec{i}-\vec{j}+\vec{k}$ and $\vec{c}$ is a unit vector perpendicular to the vector $\vec{a}$ and coplanar with $\vec{a}$ and $\vec{b}$, then a unit vector $\vec{d}$ perpendicular , to both $\vec{a}$ and $\vec{c}$ is :

(a) $\frac{1}{\sqrt{6}}(2\vec{i}-\vec{j}+\vec{k})$ (b) $\frac{1}{\sqrt{2}}(\vec{i}+\vec{j})$ (c) $\frac{1}{\sqrt{2}}(\vec{j}+\vec{k})$ (d) $\frac{1}{\sqrt{2}}(\vec{i}+\vec{k})$

QNo38: The unit vector perpendicular to each of the vectors $\vec{i}+2\vec{j}+3\vec{k}$ and $-3\vec{i}-2\vec{j}+\vec{k}$ is

(a) $\frac{1}{6\sqrt{5}}(8\vec{i}-10\vec{j}+4\vec{k})$ (b) $8\vec{i}-10\vec{j}+4\vec{k}$ (c) $8\vec{i}+10\vec{j}+4\vec{k}$ (d) none of these

QNo39: A unit vector perpendicular to each of the vectors $-6\vec{i}+8\vec{k}$, $8\vec{i}+6\vec{k}$ forming a right handed system is :

(a) $-\vec{j}$ (b) $\vec{j}$ (c) $\frac{1}{10}(6\vec{i}+8\vec{k})$ (d) $\frac{1}{10}(-6\vec{i}+8\vec{k})$

QNo40: If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a}+\vec{b}+\vec{c}=\vec{0}$, then the value of $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}$ =

(a) 2 / 3 (b) -2 / 3 (c) –(3 / 2) (d) 3 /2

QNo41: If $\vec{x}$ and $\vec{y}$ are two unit vectors and θ is the angle between them, then $\frac{1}{2}\left|\vec{x}-\vec{y}\right|$ is equal to :

(a) 0 (b) x / 2 (c) $\cos\frac{\theta}{2}$ (d) $\sin\frac{\theta}{2}$

QNo42: $[\vec{a}\,\vec{b}\,\vec{c}]$ is the scalar product of three vectors $\vec{a}, \vec{b}$ and $\vec{c}$. Then $[\vec{a}\,\vec{b}\,\vec{c}]$ is equal to

(a) $[\vec{b}\,\vec{a}\,\vec{c}]$ (b) $[\vec{c}\,\vec{b}\,\vec{a}]$ (c) $[\vec{b}\,\vec{c}\,\vec{a}]$ (d) $[\vec{a}\,\vec{c}\,\vec{b}]$

QNo43: If θ is the angle between vectors $\vec{a}$ and $\vec{b}$, then $\vec{a}.\vec{b} > 0$ only if

(a) $0\le\theta\le\pi$ (b) $\frac{\pi}{2}\le\theta\le\pi$ (c) $0\le\theta\le\frac{\pi}{2}$ (d) $0<\theta<\frac{\pi}{2}$

QNo44: If θ is the angle between vectors $\vec{a}, \vec{b}$, and $\left|\vec{a}\times\vec{b}\right| = \sqrt{3}\left|\vec{a}.\vec{b}\right|$, then θ is equal to :

(a) π /6 (b) π / 4 (c) π / 2 (d) π / 3

QNo45: If $\vec{a}.\vec{b} = \vec{b}.\vec{c} = \vec{c}.\vec{a} = 0$, then $\vec{a}\,.\,(\vec{b}\times\vec{c})$ is equal to :

(a) a non- zero vector (b) 1 (c) -1 (d) $\left|\vec{a}\right|\;\left|\vec{b}\right|\;\left|\vec{c}\right|$

QNo46: Let $\vec{a}, \vec{b}, \vec{c}$ be the position vectors of three vertices A, B, C of a triangle respectively . Then the area of this triangle is given by :

(a) $\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}$ (b) $\frac{1}{2}(\vec{a}\times\vec{b}).\vec{c}$ (c) $\frac{1}{2}\left|\vec{a}\times\vec{b}+\vec{b}\times\vec{c}+\vec{c}\times\vec{a}\right|$ (d) none of these

QNo47: The sine of the angle between the vectors $\vec{i}-2\vec{j}+3\vec{k}$ and $2\vec{i}+\vec{j}+\vec{k}$ is :

(a) $\frac{5}{2\sqrt{7}}$ (b) $\frac{5}{\sqrt{7}}$ (c) $\frac{3}{\sqrt{14}}$ (d) $\frac{5}{21}$

QNo48: The value of $[\vec{a}-\vec{b}, \vec{b}-\vec{c}, \vec{c}-\vec{a}]$ where $\left|\vec{a}\right|$ = 1, $\left|\vec{b}\right|$ =2 and $\left|\vec{c}\right|$ = 3 is

(a) 1 (b) 6 (c) 0 (d) 3.

QNo49: $[\vec{a}+\vec{b}, \vec{b}+\vec{c}, \vec{c}+\vec{a}]$ is equal to

(a) 0 (b) $\vec{a}\times\vec{b}.\vec{c}$ (c) $2|\vec{a}\,\vec{b}\,\vec{c}|$ (d) none of these

QNo50: The sine of the angle between the vectors $\vec{a}=3\vec{i}+\vec{j}+\vec{k}, \vec{b}=2\vec{i}-2\vec{j}+\vec{k}$ is :

(a) $\sqrt{\frac{74}{99}}$ (b) $\sqrt{\frac{25}{99}}$ (c) $\sqrt{\frac{37}{99}}$ (d) $\frac{5}{\sqrt{41}}$

QNo51: If θ is the angle between two vectors $\vec{a}$ and $\vec{b}$, then $\frac{\left|\vec{a}\times\vec{b}\right|}{\left|\vec{a}.\vec{b}\right|}$ equals :

(a) cot θ (b) – cot θ (c) tan θ (d) - tan θ

QNo52: The vector $\vec{a}\times(\vec{b}\times\vec{a})$ is :

(a) a null vector (b) perpendicular to both $\vec{a}$ and $\vec{b}$ (c) perpendicular to $\vec{a}$ (d) perpendicular to $\vec{b}$

QNo53: If $\vec{a}$ and $\vec{b}$ are any two vectors , then

(a) $|\vec{a}\times\vec{b}| \le |\vec{a}|\ |\vec{b}|$ (b) $|\vec{a}\times\vec{b}| \ge |\vec{a}|\ |\vec{b}|$ (c) $|\vec{a}\times\vec{b}| > |\vec{a}|\ |\vec{b}|$ (d) $|\vec{a}\times\vec{b}| < |\vec{a}|\ |\vec{b}|$

QNo54: If $\vec{a}$ and $\vec{b}$ are any two vectors, then

(a) $|\vec{a}.\vec{b}| > |\vec{a}|\ |\vec{b}|$ (b) $|\vec{a}.\vec{b}| < |\vec{a}|\ |\vec{b}|$ (c) $|\vec{a}.\vec{b}| \ge |\vec{a}|\ |\vec{b}|$ (d) $|\vec{a}.\vec{b}| \le |\vec{a}|\ |\vec{b}|$

QNo55: Let the vectors $\vec{u}, \vec{v}$ and $\vec{w}$ be coplanar . Then $\vec{u}\cdot(\vec{v}\times\vec{w})$ is :

(a) 0 (b) $\vec{0}$ (c) a unit vector (d) none of these

QNo56: The vector $2\vec{i}+\vec{j}+\vec{k}$ is perpendicular to $\vec{i}-4\vec{j}+\lambda\vec{k}$ if λ is equal to :

(a) 0 (b) -1 (c) 2 (d) -3

QNo57: The angle between the vectors $2\vec{i}+3\vec{j}+\vec{k}$ and $2\vec{i}-\vec{j}-\vec{k}$ is :

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) 0

QNo58: If $\vec{a}=4\vec{i}+6\vec{j}$ and $\vec{b}=3\vec{j}+4\vec{k}$, then the vector form of the component of $\vec{a}$ along $\vec{b}$ is :

(a) $\frac{18}{10\sqrt{3}}(3\vec{j}+4\vec{k})$ (b) $\frac{18}{5}(3\vec{j}+4\vec{k})$ (c) $\frac{18}{\sqrt{13}}(3\vec{j}+4\vec{k})$ (d) $3\vec{j}+4\vec{k}$

QNo59: Area of the parallelogram whose diagonals are $\vec{a}$ and $\vec{b}$ is :

(a) $\vec{a}.\vec{b}$ (b) $|\vec{a}\times\vec{b}|$ (c) $\vec{a}+\vec{b}$ (d) $\frac{1}{2}\ |\vec{a}+\vec{b}|$

QNo60: The area of the parallelogram whose diagonals are given by the vectors

$3\vec{i}+\vec{j}-2\vec{k}$ and $\vec{i}-3\vec{j}+4\vec{k}$ is

(a) $10\sqrt{3}$ (b) $5\sqrt{3}$ (c) 8 (d) 4

QNo61: Let G be the centroid of a triangle ABC. If $\overrightarrow{AB}=\vec{a}$, $\overrightarrow{AC}=\vec{b}$, then the bisector $\overrightarrow{AB}$, in terms of vectors $\vec{a}$ and $\vec{b}$ is :

(a) $\frac{2}{3}(\vec{a}+\vec{b})$ (b) $\frac{1}{6}(\vec{a}+\vec{b})$ (c) $\frac{1}{3}(\vec{a}+\vec{b})$ (d) $\frac{1}{2}(\vec{a}+\vec{b})$

QNo62: If A, B , C, D , E are five coplanar points then $\overrightarrow{DA}+\overrightarrow{DB}+\overrightarrow{DC}+\overrightarrow{AE}+\overrightarrow{BE}+\overrightarrow{CE}$ is equal to

(a) $\overrightarrow{DE}$ (b) 3 $\overrightarrow{DE}$ (c) 2 $\overrightarrow{DE}$ (d) 4 $\overrightarrow{ED}$

QNo63: If three points A, B, C whose position vectors are respectively $\vec{i}-2\vec{j}-8\vec{k}$ and $5\vec{i}-2\vec{k}$ and $11\vec{i}+3\vec{j}+7\vec{k}$ are collinear , then the ratios in which B, divides AC is :

(a) 1 : 2 (b) 2 : 3 (c) 2 : 1 (d) none of these

QNo64: In a | | gm ABCD, $|\overrightarrow{AB}|$ = a , $|\overrightarrow{AD}|$ = b and $|\overrightarrow{AC}|$ = c, then $\overrightarrow{DB}.\overrightarrow{AB}$ 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) $\frac{a^2+3b^2+c^2}{2}$

QNo65: The position vectors of four points P, Q, R, S are $2\vec{a}+4\vec{c}, 5\vec{a}+3\sqrt{3}\vec{b}+4\vec{c}, -2\sqrt{3}\vec{b}+\vec{c}$ and $2\vec{a}+\vec{c}$ respectively . Then

(a) PQ | | RS (b) PQ is not parallel to RS (c) PQ = RS (d) PQ | | RS and PQ = RS

QNo66: Let $\overrightarrow{OA}=\vec{i}+3\vec{j}-2\vec{k}$ and $\overrightarrow{OB}=3\vec{i}+\vec{j}-2\vec{k}$.

The vector $\overrightarrow{OC}$ bisecting the angle AOB and C being a point on the line AB is

(a) $4(\vec{i}+\vec{j}-\vec{k})$ (b) $2(\vec{i}+\vec{j}-\vec{k})$ (c) $(\vec{i}+\vec{j}-\vec{k})$ (d) none of these

QNo67: Let α, β, λ be three distinct real numbers. The points with position vectors $\alpha\vec{i}+\beta\vec{j}-\lambda\vec{k}$, $\beta\vec{i}+\lambda\vec{j}+\alpha\vec{k}$, $\lambda\vec{i}+\alpha\vec{j}+\beta\vec{k}$

(a) are collinear (b) form a equilateral triangle (c) form a scalene triangle (d) form a right angled triangle

QNo68: Let $\vec{p}$ and $\vec{q}$ be the position vectors of P and Q respectively, with respect to O and $\left|\vec{p}\right|$ = p, $\left|\vec{q}\right|$ = q. The points R and S divide PQ internally and externally in the ratio 2 : 3 respectively. If $\overrightarrow{OR}$ and $\overrightarrow{OS}$ are perpendicular, then :

(a) $9p^2 = 4q^2$ (b) $4p^2 = 9q^2$ (c) $9p = 4q$ (d) $4p = 9q$

QNo69: A unit vector perpendicular to the vectors $4\vec{i}-\vec{j}+3\vec{k}$ and $-2\vec{i}+\vec{j}-2\vec{k}$ is

(a) $\frac{1}{3}(\vec{i}-2\vec{j}+2\vec{k})$ (b) $\frac{1}{3}(-\vec{i}+2\vec{j}+2\vec{k})$ (c) $\frac{1}{3}(2\vec{i}+\vec{j}+2\vec{k})$ (d) $\frac{1}{3}(2\vec{i}-2\vec{j}+2\vec{k})$

QNo70: Given $\vec{a}=\vec{i}+\vec{j}-\vec{k}$, $\vec{b}=-\vec{i}+\vec{j}+\vec{k}$ and $\vec{c}=-\vec{i}+2\vec{j}-\vec{k}$. A unit vector perpendicular to both $\vec{a}+\vec{b}$ and $\vec{b}+\vec{c}$ is :

(a) $\vec{i}$ (b) $\vec{k}$ (c) $\vec{j}$ (d) $\frac{\vec{i}+\vec{j}+\vec{k}}{\sqrt{3}}$

QNo71: For a non- zero vector $\vec{a}$, which of the following statement is true :

(a) $\vec{a}.\vec{a}\geq 0$ (b) $\vec{a}.\vec{a}>0$ (c) $\vec{a}.\vec{a}=0$ (d) $\vec{a}.\vec{a}\leq 0$

QNo72: For a non- zero vector $\vec{a}$, the set of real numbers satisfying the inequality $\left|(5-x)\vec{a}\right|<\left|2\vec{a}\right|$ consists of all x such that :

(a) 0 < x < 3 (b) 3 < x < 7 (c) -7 < x < - 3 (d) -7 < x < 3

QNo73: A vector $\vec{a}$ has magnitudes 5 units and points north east and another vector $\vec{b}$ has magnitude 5 units and point north west. Then the magnitude of the vector $\left(\vec{a}-\vec{b}\right)$ is :

(a) 0 (b) $5\sqrt{2}$ (c) 10 (d) 25

QNo74: The position vectors of three consecutive vertices A, B and C of a parallelogram ABCD are $\vec{r_1}, \vec{r_2}$ and $\vec{r_3}$ respectively. Then the position vector of the fourth vertex D is :

(a) $\vec{r_1}+\vec{r_2}-\vec{r_3}$ (b) $\vec{r_2}+\vec{r_3}-\vec{r_1}$ (c) $\vec{r_3}+\vec{r_1}-\vec{r_2}$ (d) none of these

QNo75: If vectors $\overrightarrow{AB} = 3\vec{i}-3\vec{k}$ and $\overrightarrow{AC} = \vec{i}-2\vec{j}+\vec{k}$ are the sides of a triangle ABC, then the length of the median AM, is

(a) $\sqrt{3}$ (b) $\sqrt{6}$ (c) $2\sqrt{3}$ (d) $3\sqrt{2}$

QNo76: If the points A, B, C and D have position vectors $\vec{a}$, $2\vec{a}+\vec{b}$, $4\vec{a}+2\vec{b}$ and $5\vec{a}+4\vec{b}$ respectively. Then the three collinear points are :

(a) A, B and C (b) A, C and D (c) A, B and D (d) B, C and D

QNo77: For non- zero vectors $\vec{a}$ and $\vec{b}$, if $\left|\vec{a}+\vec{b}\right| < \left|\vec{a}-\vec{b}\right|$, then $\vec{a}$ and $\vec{b}$ are

(a) collinear (b) perpendicular to each other (c) inclined at an acute angle (d) inclined at an obtuse angle

QNo78: For the vectors $\vec{a} = \vec{i}+2\vec{j}+\vec{k}$, $\vec{b}=2\vec{i}+\vec{j}$, $\vec{c}=3\vec{i}-4\vec{j}-5\vec{k}$, If $\vec{a}+t\vec{b}$ is perpendicular to $\vec{c}$, the value pf t, is :

(a) 1 (b) -4 (c) 4 (d) 5

QNo79: If the difference of two unit vectors is again a unit vector, then the angle between them is :

(a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0

QNo80: If $\vec{x}\times\vec{b}=\vec{c}\times\vec{b}$ and $\vec{x}\perp\vec{a}$, then $\vec{x}$ is equal to

(a) $\dfrac{(\vec{b}\times\vec{c})\times\vec{a}}{\vec{b}.\vec{a}}$ (b) $\dfrac{\vec{b}\times(\vec{a}\times\vec{c})}{\vec{b}.\vec{c}}$ (c) $\dfrac{(\vec{c}\times\vec{b})\times\vec{a}}{\vec{a}.\vec{b}}$ (d) none of these

QNo81: The adjacent sides of a parallelogram are $\vec{a}=\vec{i}+2\vec{j}$ and $\vec{b}=2\vec{i}+\vec{j}$, where $\vec{i}$ and $\vec{j}$ are the usual unit vectors along the positive directions of x and y axes respectively . Then the angle between the diagonals is :

(a) 30^0 and 150^0 (b) 45^0 and 135^0 (c) 60^0 and 120^0 (d) 90^0 and 90^0

QNo82: If $\vec{a}$ and $\vec{b}$ are two vectors such that $\vec{a}.\vec{b}=0$ and $\vec{a}\times\vec{b}=\vec{0}$, then the correct statement is ;

(a) $\vec{a}$ is parallel to $\vec{b}$ (b) $\vec{a}$ is perpendicular to $\vec{b}$ (c) either $\vec{a} = \vec{0}$ or $\vec{b}=\vec{0}$ (d) none of these

QNo83: If $\vec{c} = \vec{a}\times\vec{b}$ and $\vec{b} = \vec{c}\times\vec{a}$, then

(a) $\vec{a}.\vec{b}=\vec{c}^{\,2}$ (b) $\vec{c}.\vec{a}=\vec{b}^{\,2}$ (c) $\vec{b}.\vec{c}=\vec{a}^{\,2}$ (d) $\vec{a}\perp\vec{b}$ or $\vec{a}\,||\,\vec{b}\times\vec{c}$

QNo84: If $\vec{v}$ and $\vec{w}$ are two mutually perpendicular unit vector and $\vec{u}$ = a$\vec{v}$ + b$\vec{w}$, where a and b are non- zero real numbers, then the angle between $\vec{u}$ and $\vec{w}$ is :

(a) $\cos^{-1}$ (a) (b) $\cos^{-1}$ (b) (c) $\cos^{-1}\left(\dfrac{a}{\sqrt{a^2+b^2}}\right)$ (d) $\cos^{-1}\left(\dfrac{b}{\sqrt{a^2+b^2}}\right)$

QNo85: If $\vec{a}$ and $\vec{b}$ are two non- zero vectors, then a vector perpendicular to the vector $(\vec{b}.\vec{b})\vec{a}-(\vec{a}.\vec{b})\vec{b}$ is

(a) $\vec{a}$ (b) $\vec{b}$ (c) $\vec{a}-\vec{b}$ (d) $\vec{a}+\vec{b}$

QNo86: The vector $\frac{1}{3}(2\vec{i}-2\vec{j}+\vec{k})$. is

(a) a unit vector

(b) makes an angle $\frac{\pi}{3}$ with the vector $2\vec{i}-4\vec{j}+3\vec{k}$

(c) parallel to the vector $-\vec{i}+\vec{j}+\frac{1}{3}\vec{k}$

(d) $\perp$ to the vector $3\vec{i}+2\vec{j}+2\vec{k}$

QNo87: Given that $(\vec{a}+\vec{b})$ is perpendicular to $\vec{b}$ and $\vec{a}$ is perpendicular to $2\vec{b}$ + $\vec{a}$. This implies

(a) a = $\sqrt{2}$ b (b) a = 2b (c) a = b (d) 2a = b

QNo88: Let $\left|\vec{a}\right|=3$ and $\left|\vec{b}\right|=4$. The value of λ for which $\vec{a}+\lambda\vec{b}$ and $\vec{a}-\lambda\vec{b}$ are perpendicular is given by :

(a) $\pm\frac{3}{4}$ (b) $-\frac{2}{3}$ (c) $\frac{2}{3}$ (d) $-\frac{3}{5}$

QNo89: The vectors $\vec{a} = \vec{i}+\vec{j}, \vec{b}=\vec{j}+\vec{k}$ and $\vec{c}$ are of same length and taken pairwise, form equal angles . Then $\vec{c}$ is equal to :

(a) $\vec{i}+2\vec{j}+\vec{k}$ (b) $-\frac{1}{3}\vec{i}+\frac{4}{3}\vec{j}-\frac{1}{3}\vec{k}$ (c) $\vec{i}-\vec{j}+\vec{k}$ (d) none of these

QNo90: Let $\vec{a}$ be a vector of magnitude $\sqrt{75}$ which is perpendicular to both $2\vec{i}-\vec{j}+\vec{k}$ and $3\vec{i}+2\vec{j}-\vec{k}$ Then $\vec{a}$ is equal to :

(a) $-\vec{i}+5\vec{j}+7\vec{k}$ (b) $7\vec{i}+5\vec{j}+\vec{k}$ (c) $\vec{i}+5\vec{j}-7\vec{k}$ (d) $-7\vec{i}-5\vec{j}-\vec{k}$

QNo91: A tetrahedron has vertices at O (0, 0,0), A (1, 2, 1), B (2, 1, 3) and C (-1, 1, 2). Then the angle between the faces OAB and ABC will be :

(a) $\cos^{-1}\left(\frac{19}{35}\right)$ (b) $\cos^{-1}\left(\frac{71}{31}\right)$ (c) 30^0 (d) 90^0

QNo92: Given the vectors $\vec{a}$ = (3, -1, 5) and $\vec{b}$ = (1, 2, -3) . A vector $\vec{c}$ is such that it is perpendicular to the z- axis and satisfies the conditions $\vec{c}.\vec{a}$ 9 and $\vec{c}.\vec{b}$ = -4 . Then $\vec{c}$ is equal to :

(a) (-2, 3, 0) (b) (2, -3, 1) (c) (2, -3, 0) (d) none of these

QNo93: Projection of the vector $2\vec{i}+3\vec{j}-2\vec{k}$ on the vector $\vec{i}+2\vec{j}+3\vec{k}$ is :

(a) $\frac{2}{\sqrt{14}}$ (b) $\frac{1}{\sqrt{14}}$ (c) $\frac{3}{\sqrt{14}}$ (d) none of these

QNo94: Direction of zero vector

(a) does not exist (b) is towards origin (c) is indeterminate (d) none of these

QNo95: If $a\vec{i}+\vec{j}+\vec{k}$, $\vec{i}-b\vec{j}+\vec{k}$, $\vec{i}+\vec{j}-c\vec{k}$ are coplanar, then abc + 2 is equal to

(a) a + b + c (b) a – b – c (c) a + b + c (d) a – b + c

QNo96: The Points D, E, F divide BC, CA, AB of triangle ABC in the ratio 1 : 4, 3 : 2 and 3: 7 respectively and the point K divides AB in the ratio 1 : 3. Let $\vec{R_1}$ be the resultant of the vectors $\overrightarrow{AD}$, $\overrightarrow{BE}$, $\overrightarrow{CF}$ and let the vector CK be denoted by $\vec{R_2}$. Then

(a) $\vec{R_1}=\vec{R_2}$ (b) $5\vec{R_1}=2\vec{R_2}$ (c) $2\vec{R_1}=5\vec{R_2}$ (d) none of these

QNo97: If $\overrightarrow{AB}$ = $3\vec{i}+\vec{j}-\vec{k}$ and $\overrightarrow{AC}$ = $\vec{i}-\vec{j}+3\vec{k}$. If the point P on the line segment BC is equidistant from AB and AC , then $\overrightarrow{AP}$ is :

(a) $2\vec{i}-\vec{k}$ (b) $\vec{i}-2\vec{k}$ (c) $2\vec{i}+\vec{k}$ (d) none of these

QNo98: P is a point on the line through the point A whose position vector is $\vec{a}$ and the line is parallel to the vector $\vec{b}$. If PA = 6, then the position vector of P is :

(a) $\vec{a}+6\vec{b}$ (b) $\vec{a}\pm\frac{6}{|\vec{b}|}\vec{b}$ (c) $\vec{a}-6\vec{b}$ (d) $\vec{b}+\frac{6}{|\vec{a}|}\vec{a}$

QNo99: The position vectors of the vertices A, B, C of a triangle are $\vec{i}-\vec{j}-3\vec{k}$, $2\vec{i}+\vec{j}-2\vec{k}$ and $-5\vec{i}+2\vec{j}-6\vec{k}$ respectively . The length of the bisector AD of the angle BAC where D is on the line segment is :

(a) 15 / 2 (b) 1 / 4 (c) 11 / 2 (d) none of these

QNo100: If the positive vectors of points A, B, C are respectively $\vec{r},\vec{j},\vec{k}$ and $\overrightarrow{AB}=\overrightarrow{CX}$, then the position vector of point X is :

(a) $-\vec{i}+\vec{j}+\vec{k}$ (b) $\vec{i}-\vec{j}+\vec{k}$ (c) $\vec{i}+\vec{j}-\vec{k}$ (d) $\vec{i}+\vec{j}+\vec{k}$

QNo101: A and B are two points. The position vector of A is $6\vec{b}-2\vec{a}$ A point P divides the line AB in the ratio 1 : 2. If $\vec{a}-\vec{b}$ is the position vector of B is given by :

(a) $7\vec{a}-15\vec{b}$ (b) $7\vec{a}+15\vec{b}$ (c) $15\vec{a}-7\vec{b}$ (d) $15\vec{a}+7\vec{b}$

QNo102: The perimeter of the triangle whose vertices have the position vectors $(\vec{i}+\vec{j}+\vec{k})$, $(5\vec{i}+3\vec{j}-3\vec{k})$ and $(2\vec{i}+5\vec{j}+9\vec{k})$, is given by :

(a) $15+\sqrt{157}$ (b) $15-\sqrt{157}$ (c) $\sqrt{15}-\sqrt{157}$ (d) $\sqrt{15}+\sqrt{157}$

QNo103: If $\vec{a} = 2\vec{i}-\vec{j}+3\vec{k}$, $\vec{b} = \vec{i}+2\vec{j}+\vec{k}$, $\vec{c} = 3\vec{i}+\vec{j}+2\vec{k}$, then the value of $\vec{a}\cdot(\vec{b}\times\vec{c})$ is :

(a) 0 (b) -10 (c) 1 (d) 10

QNo104: ABCDEF is a regular hexagon and $\overrightarrow{AB} = \vec{a}$, $\overrightarrow{BC} = \vec{b}$ and $\overrightarrow{CD} = \vec{c}$, then $\overrightarrow{AE}$ is :

(a) $\vec{a}+\vec{b}+\vec{c}$ (b) $\vec{a}+\vec{b}$ (c) $\vec{b}+\vec{c}$ (d) $\vec{c}+\vec{a}$

QNo105: Let $\vec{a},\vec{b},\vec{c}$ be three non- coplanar vectors and $\vec{p},\vec{q},\vec{r}$ are vectors defined by the relation

$\vec{p} = \dfrac{\vec{b}\times\vec{c}}{(\vec{a}\,\vec{b}\,\vec{c})};\ \vec{q} = \dfrac{\vec{c}\times\vec{a}}{(\vec{a}\,\vec{b}\,\vec{c})};\ \vec{r} = \dfrac{\vec{a}\times\vec{b}}{(\vec{a}\,\vec{b}\,\vec{c})}$ then the value of the expression

$\vec{a}+\vec{b}\,.\,\vec{p}+(\vec{b}+\vec{c}).\vec{q}+(\vec{c}+\vec{a}).\vec{r}$ is equal to :

(a) 0 (b) 1 (c) 2 (d) 3

QNo106: The unit vector perpendicular to each of the vectors $2\vec{i}-\vec{j}+\vec{k}$ and $3\vec{i}+4\vec{j}$ is :

(a) $\dfrac{1}{\sqrt{146}}(4\vec{i}-3\vec{j}+11\vec{k})$ (b) $\dfrac{1}{\sqrt{146}}(-4\vec{i}+3\vec{j}+11\vec{k})$

(c) $\dfrac{1}{\sqrt{146}}(4\vec{i}+3\vec{j}+11\vec{k})$ (d) $\dfrac{1}{146}(-4\vec{i}+3\vec{j}+11\vec{k})$

QNo107: Let $\vec{a},\vec{b},\vec{c}$ be three vectors such that $\vec{a}.(\vec{b}+\vec{c})+\vec{b}.(\vec{c}+\vec{a})+\vec{c}.(\vec{a}+\vec{b})=0$ and $|\vec{a}| = 1$, $|\vec{b}| = 4$, $|\vec{c}| = 8$, then $|\vec{a}+\vec{b}+\vec{c}|$ equals :

(a) 13 (b) 81 (c) 9 (d) 5

QNo108: The sum of two unit vector is a unit vector. The magnitude of their difference is :

(a) 2 (b) $\sqrt{3}$ (c) $\sqrt{2}$ (d) 1

QNo109: If $\vec{a},\vec{b},\vec{c}$ and $\vec{a}$ are the position vectors of points A, B, C and D such that no three of them are collinear and $\vec{a}+\vec{c} = \vec{b}+\vec{d}$, then ABCD is :

(a) a parallelogram (b) a rhombus (c) a rectangle (d) a square

QNo110: The vector $2\vec{i}-m\vec{j}+m\vec{k}$ and $(1+m)\vec{i}-2m\vec{j}+\vec{k}$ include an acute angle for

(a) all values of m (b) $m < -2$ or $m > -\dfrac{1}{2}$ (c) $m = -\dfrac{1}{2}$ (d) $m \in \left[-2, -\dfrac{1}{2}\right]$

QNo111: If for vector $\vec{a}$ and $\vec{b}, \vec{a}+\vec{b} \neq \vec{0}$ and $\vec{c}$ is a non- zero vector, then $(\vec{a}+\vec{b}) \times [\vec{c}-(\vec{a}+\vec{b})]$ is :

(a) $\vec{a}+\vec{b}$ (b) $(\vec{a}+\vec{b})\times\vec{c}$ (c) $\lambda\vec{c}$, where λ is a non- zero scalar (d) $\lambda(\vec{a}+\vec{b})$, $\lambda \neq 0, 1$, a scalar

QNo112: If a, b, c are different real numbers, $a\vec{i}+b\vec{j}+c\vec{k}$, $b\vec{i}+c\vec{j}+a\vec{k}$ and $c\vec{i}+a\vec{j}+b\vec{k}$ are position vectors of three non- collinear points A, B , C, then

(a) centroid of ΔABC is $\dfrac{a+b+c}{3}(\vec{i}+\vec{j}+\vec{k})$ (b) $(\vec{i}+\vec{j}+\vec{k})$ is not equally inclined to three vectors

(c) triangle ABC is a scalene triangle

(d) perpendicular from the origin to the plane of the triangle does not meet it at the centroid

QNo113: If $\vec{a}$ and $\vec{b}$ are two perpendicular vectors, then out of the following three statements

(i) $(\vec{a}+\vec{b})^2 = (\vec{a})^2 + (\vec{b})^2$ (b) $(\vec{a}-\vec{b})^2 \; (\vec{a})^2 - (\vec{b})^2$ (c) $(\vec{a}-\vec{b})^2 \; (\vec{a})^2 + (\vec{b})^2$ (d) $(\vec{a}+\vec{b})^2 = (\vec{a}-\vec{b})^2$

(a) only one is correct (b) only two are correct (c) only three are correct (d) all the four are correct

QNo114: Any line passing thro' two points whose position vectors are $\vec{a}+\vec{b}$ and $\vec{a}-\vec{b}$ is $\vec{r}$ =

(a) $\vec{a}+(1-2t)\vec{b}$ (b) $\vec{a}-(1-2t)\vec{b}$ (c) $\vec{a}+(1+2t)\vec{b}$ (d) $\vec{a}+(2t-1)\vec{b}$

QNo115: If $\vec{x}.\vec{a}$ = 0, $\vec{x}.\vec{b}$ =0, $\vec{x}.\vec{c}$ = 0 for some non- zero vectors $\vec{x}$, then $[\vec{a}+\vec{b}+\vec{c}]$ = 0, is

(a) true (b) false (c) cannot say anything (d) none of these

QNo116: Let $\vec{A}, \vec{B}, \vec{C}$ be unit vectors. Suppose $\vec{A}.\vec{B}$ = $\vec{A}.\vec{C}$ = 0 and the angle between $\vec{B}$ and $\vec{C}$ is $\frac{\pi}{6}$. Then A Equals:

(a) $\vec{B}\times\vec{C}$ (b) 2($\vec{B}\times\vec{C}$) (c) -2($\vec{B}\times\vec{C}$) (d) ± 2 ($\vec{B}\times\vec{C}$)

QNo117: If $\vec{A}, \vec{B}, \vec{C}$ are three non- coplanar vectors, then $\frac{\vec{A}.\vec{B}\times\vec{C}}{\vec{C}\times\vec{A}.\vec{B}} + \frac{\vec{B}.\vec{A}\times\vec{C}}{\vec{C}.\vec{A}\times\vec{B}}$ is equal to

(a) -1 (b) 0 (c) 1 (d) none of these

QNo118: $(\vec{a}\times\vec{b})\times\vec{c} = \vec{a}\times(\vec{b}\times\vec{c})$ iff

(a) $(\vec{a}\times\vec{b})\times\vec{c}=\vec{0}$ (b) $\vec{c}\times\vec{a}=\vec{b}$ (c) $\vec{a}\times\vec{c}\times\vec{b}=\vec{0}$ (d) none of these

QNo119: If $\vec{a}$ = $2\vec{i}-3\vec{j}-\vec{k}$ and $\vec{b}=\vec{i}+4\vec{j}-2\vec{k}$, then $(\vec{a}+\vec{b})\times(\vec{a}-\vec{b})$ is given by

(a) $20\vec{i}+6\vec{j}-22\vec{k}$ (b) $-(20\vec{i}+6\vec{j}-22\vec{k})$ (c) $6\vec{i}+20\vec{j}+22\vec{k}$ (d) $20\vec{i}+22\vec{j}+6\vec{k}$

QNo120: If $\vec{a}+\vec{b}+\vec{c}=\vec{0}$ and $|\vec{a}|$ = 3, $|\vec{b}|$ =5, $|\vec{c}|$ =7, then the angle between $\vec{a}$ and $\vec{b}$ is :

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

QNo121: If P and Q be two given points on the curve y = x + $\frac{1}{x}$ such that $\overrightarrow{OP}.\vec{i}$ = 1 and $\overrightarrow{OQ}.\vec{i}$ = -1 where $\vec{i}$ is a unit vector along the x- axis, then the length of vector 2 $\overrightarrow{OP}$ + 3 $\overrightarrow{OQ}$ is :

(a) $5\sqrt{5}$ (b) $3\sqrt{5}$ (c) $2\sqrt{5}$ (d) $\sqrt{5}$

QNo122: a, b, c are the pth, qth, rth terms of an H.P. and $\vec{u}$ = (q – r) $\vec{i}$ + (r – p) $\vec{j}$ + (p – q) $\vec{k}$

$\vec{v}=\frac{\vec{i}}{a}+\frac{\vec{j}}{b}+\frac{\vec{k}}{c}$, then

(a) $\vec{u},\vec{v}$ are parallel vectors (b) $\vec{u},\vec{v}$ are orthogonal vectors (c) $\vec{u},\vec{v}$ = 1 (d) $\vec{u}\times\vec{v}=\vec{i}+\vec{j}+\vec{k}$

QNo123: If $\vec{a}+\vec{b}\perp\vec{a}$ and $|\vec{b}| = \sqrt{2}\;|\vec{a}|$, then

(a) $(2\vec{a}+\vec{b})$ is parallel to $\vec{b}$ (b) $(2\vec{a}+\vec{b})\perp\vec{b}$ (c) $(2\vec{a}-\vec{b})\perp\vec{b}$ (d) $(2\vec{a}-\vec{b})\perp\vec{a}$

QNo124: Let $\vec{\lambda}=\vec{a}\times(\vec{b}+\vec{c}), \vec{\mu}=\vec{b}\times(\vec{c}+\vec{a})\, \vec{v}=\vec{c}\times(\vec{a}+\vec{b})$. Then

(a) $\vec{\lambda}+\vec{u}=\vec{v}$ (b) $\vec{\lambda},\vec{u},\vec{v}$ are coplanar (c) $\vec{\lambda}+\vec{v}=2\vec{u}$ (d) none of these

QNo125: If $\vec{a}=\vec{i}+\vec{j}, \vec{b}=2\vec{j}-\vec{k}$ and $\vec{r}\times\vec{a}=\vec{b}\times\vec{a}$, $\vec{r}\times\vec{b}=\vec{a}\times\vec{b}$, then $\dfrac{\vec{r}}{|\vec{r}|}$ is equal to

(a) $\frac{1}{\sqrt{11}}(\vec{i}+3\vec{j}-\vec{k})$ (b) $\frac{1}{\sqrt{11}}(\vec{i}-3\vec{j}+\vec{k})$ (c) $\frac{1}{\sqrt{3}}(\vec{i}-\vec{j}+\vec{k})$ (d) none of these

QNo126: If $\vec{a},\vec{b},\vec{c}$ are three vectors such that $(\vec{a}+\vec{b}).\vec{c}$ = $(\vec{a}-\vec{b}).\vec{c}$ = 0, then $(\vec{a}\times\vec{b})\times\vec{c}$ is :

(a) $\vec{0}$ (b) $\vec{a}$ (c) $\vec{b}$ (d) none of these

QNo127: If $\vec{a},\vec{b},\vec{c}$ are three non- coplanar non- zero vectors, then $(\vec{a}.\vec{a})\vec{b}\times\vec{c}+(\vec{a}.\vec{b})\vec{c}\times\vec{a}+(\vec{a}.\vec{c})\vec{a}\times\vec{b}$ is equal to :

(a) $[\vec{b}\ \vec{c}\ \vec{a}]\vec{a}$ (b) $[\vec{c}\ \vec{a}\ \vec{b}]\vec{b}$ (c) $[\vec{a}\,\vec{b}\,\vec{c}]\vec{c}$ (d) none of these

QNo128: The three concurrent the edges of a parallelepiped represents the vectors $\vec{a},\vec{b},\vec{c}$ such that $[\vec{a}\,\vec{b}\,\vec{c}] = \lambda$. Then the volume of the parallelepiped whose three concurrent edges are the three concurrent diagonals of three faces of the given parallelepiped is :

(a) 2λ (b) 3λ (c) λ (d) none of these

QNo129: If $\vec{a},\vec{b},\vec{c}$ are three non- coplanar non- zero vectors and $\vec{r}$ is any vector in space, then

$(\vec{a}\times\vec{b})\times(\vec{r}\times\vec{c})+(\vec{b}\times\vec{c})\times(\vec{r}\times\vec{a})$ + $(\vec{c}\times\vec{a})\times(\vec{r}\times\vec{b})$ is equal to :

(a) $2\,[\vec{a}\,\vec{b}\,\vec{c}]\vec{r}$ (b) $3[\vec{a}\,\vec{b}\,\vec{c}]\vec{r}$ (c) $[\vec{a}\,\vec{b}\,\vec{c}]\vec{r}$ (d) none of these

QNo130: $\vec{AB}$ = $\vec{b}$ and $\vec{AC}$ = $\vec{c}$, then the length of the perpendicular from A to the line BC is :

(a) $\dfrac{|\vec{b}\times\vec{c}|}{|\vec{b}+\vec{c}|}$ (b) $\dfrac{|\vec{b}\times\vec{c}|}{|\vec{b}-\vec{c}|}$ (c) $\dfrac{1}{2}\dfrac{|\vec{b}\times\vec{c}|}{|\vec{b}-\vec{c}|}$ (d) none of these

QNo131: The projection of the vector $\vec{i}+\vec{j}+\vec{k}$ on the line whose vector equation is $\vec{r}=(3+t)\vec{i}+(2t-1)\vec{j}+3t\vec{k}, t$ being a scalar, is :

(a) $\frac{1}{\sqrt{14}}$ (b) 6 (c) $\frac{6}{\sqrt{14}}$ (d) none of these

QNo132: A vector $\vec{r}$ satisfies the equations $\vec{r}\times\vec{a}=\vec{b}$ and $\vec{r}.\vec{a}$ = 0 . Then

(a) $\vec{r}=\dfrac{\vec{a}\times\vec{b}}{\vec{a}.\vec{b}}$ (b) $\vec{r}=\dfrac{\vec{a}\times\vec{b}}{\vec{a}.\vec{a}}$ (c) $\vec{r}=\dfrac{\vec{a}\times\vec{b}}{\vec{b}.\vec{b}}$ (d) none of these

QNo133: If the vectors $\vec{a},\vec{b},\vec{c}$ are non- coplanar and l, m, n are distinct scalars, then

$[l\vec{a}+m\vec{b}+n\vec{c}, i\vec{b}+m\vec{c}+n\vec{a}, i\vec{c}+m\vec{a}+n\vec{b}]=0$

(a) lm + nm + nl = 0 (b) l + m + n = 0 (c) $l^2 + m^2 + n^2 = 0$ (d) $l^3 + m^3 + n^3 = 0$

QNo134:The vector $\vec{x}$ is perpendicular to the vectors $\vec{a}=2\vec{i}+3\vec{j}-\vec{k}$ and $\vec{b}=\vec{i}-2\vec{j}+3\vec{k}$. If $\vec{x}.(2\vec{i}-\vec{j}+\vec{k})$ = -6, then $\vec{x}$ =

(a) $-3\vec{i}+3\vec{j}+3\vec{k}$ (b) $3\vec{i}-3\vec{j}+3\vec{k}$ (c) $3\vec{i}+3\vec{j}-3\vec{k}$ (d) none of these

QNo135: If $\vec{d}$ is a unit vector such that $\vec{d}$ = $\lambda\vec{b}\times\vec{c}+\mu\vec{c}\times\vec{a}+\nu\vec{a}\times\vec{b}$, then

$|(\vec{d}.\vec{a})(\vec{b}\times\vec{c})+(\vec{d}.\vec{b})(\vec{c}\times\vec{a})+(\vec{d}.\vec{c})(\vec{a}\times\vec{b})|$ is equal to :

(a) $|[\vec{a}\ \vec{b}\ \vec{c}]|$ (b) 1 (c) $3|[\vec{a}\ \vec{b}\ \vec{c}]|$ (d) none of these

QNo136: If $\vec a,\vec b$ and $\vec c$ be three non- zero and non- coplanar vectors and $\vec p,\vec q$ and $\vec r$ be three vectors given by $\vec p=\vec a+\vec b-2\vec c$, $\vec q=3\vec a-2\vec b+\vec c$ and $\vec r=\vec a-4\vec b+2\vec c$. If the volume of the parallelopiped determined by $\vec a,\vec b$ and $\vec c$ is V_1 and that of the parallelopiped determined by $\vec p,\vec q$ and $\vec r$ is V_2 then $V_2 : V_1$ is :

(a) 1 : 15 (b) 15 : 1 (c) 4 : 5 (d) 5 : 4

QNo137: If $\vec a,\vec b,\vec c$ are three vectors of which every pair is non- collinear . If the vector $\vec a+\vec b$ and $\vec b+\vec c$ are collinear with $\vec c$ and $\vec a$ respectively , then $\vec a+\vec b+\vec c$ is :

(a) a unit vector (b) the null vector (c) equally inclined to $\vec a,\vec b,\vec c$ (d) none of these

QNo138: If $\vec r=3\vec i+2\vec j-5\vec k$, $\vec a=2\vec i-\vec j+\vec k$, $\vec b=\vec i+3\vec j-2\vec k$ and $\vec c=-2\vec i+\vec j-3\vec k$ such that $\vec r=\lambda\vec a+u\vec b+v\vec c$, then

(a) $\mu,\frac{\lambda}{2},v$ are in A.P. (b) λ,μ,v are in A.P. (c) λ,μ,v are in H.P. (d) μ,λ,v are in G.P.

QNo139: If $\vec a$ is perpendicular to $\vec b$ and $\vec p$ is a non- zero vector such that $p\vec r+(\vec r.\vec b)\vec a=+\vec c$, then $\vec r$ =

(a) $\frac{\vec c}{p}-\frac{(\vec b.\vec c)\vec a}{p^2}$ (b) $\frac{\vec a}{p}-\frac{(\vec c.\vec a)\vec b}{p^2}$ (c) $\frac{\vec b}{p}-\frac{(\vec a.\vec b)\vec c}{p^2}$ (d) $\frac{\vec c}{p^2}-\frac{(\vec b.\vec c)\vec a}{p}$

QNo140: A particle is acted upon by the focus $\vec F_1 = 3\vec i+2\vec j+5\vec k$ and $\vec F_2 = 2\vec i+\vec j-3\vec k$ and is displaced from the point P $(2\vec i-\vec j-3\vec k)$ to the point Q $(4\vec i-3\vec j+7\vec k)$. The work done by the force is :

(a) 17 units (b) 24 units (c) 32 units (d) none of these

QNo141: Vector moment of the force $\vec F=3\vec i+2\vec j-4\vec k$ acting at the point (1, -1, 2) about the point (2, -1, 3) is :

(a) $2\vec i-7\vec j-2\vec k$ (b) $-2\vec i-\vec j+2\vec k$ (c) $2\vec i+7\vec j-2\vec k$ (d) $-2\vec i-7\vec j+2\vec k$

QNo142: Angle between vectors $\vec i-\vec j+\vec k$ and $\vec i+2\vec j+\vec k$ is :

(a) $\cos^{-1}\frac{1}{\sqrt{15}}$ (b) $\cos^{-1}\frac{4}{\sqrt{15}}$ (c) $\cos^{-1}\frac{4}{15}$ (d) $\frac{\pi}{2}$

QNo143: The area of the parallelogram of which $\vec i$ and $\vec i+\vec j$ are adjacent is :

(a) 2 (b) $\frac{1}{2}$ (c) 1 (d) $\sqrt{2}$

QNo144: The unit vector perpendicular to vectors $\vec i-\vec j$ and $\vec i+\vec j$ forming a right handed system is :

(a) $\vec k$ (b) $-\vec k$ (c) $\frac{1}{\sqrt{2}}(\vec i-\vec j)$ (d) $\frac{1}{2}(\vec i+\vec j)$

QNo145: Value of a for which $2\vec i-\vec j+\vec k, \vec i+2\vec j-3\vec k$ and $3\vec i+a\vec j+5\vec k$ are coplanar is :

(a) 2 (b) 4 (c) -4 (d0 3

QNo146: If $\vec a,\vec b,\vec c,\vec d$ are the vertices of a square, then

(a) $(\vec b-\vec a)=(\vec c-\vec b)$ (b) $\vec a+\vec b+\vec c=\vec 0$ (c) $(\vec c-\vec a).(\vec d-\vec b)=0$ (d) none of these

QNo147: The vectors $2\vec i+3\vec j, 5\vec i+6\vec j$ and $8\vec i+\lambda\vec j$ have their initial points at (1, 1). The value of λ so that the vectors terminate on one straight line is :

(a) 0 (b) 3 (c) 6 (d) 9

QNo148: If $|\vec{a}| = \sqrt{5}$ and $|\vec{b}| = \sqrt{6}$, then $[(\vec{a}\times\vec{b})\times\vec{b}]\times\vec{b}$ is

(a) $6\ (\vec{b}\times\vec{a})$ (b) $6\ (\vec{a}\times\vec{b})$ (c) $5\ (\vec{a}\times\vec{b})$ (d) $5\ (\vec{b}\times\vec{a})$

QNo149: If $\vec{a}+\vec{b}$ is orthogonal to $\vec{b}$ and $\vec{a}+2\vec{b}$ is orthogonal to $\vec{a}$, then

(a) $|\vec{a}|=\sqrt{2}|\vec{b}|$ (b) $|\vec{a}|=2|\vec{b}|$ (c) $|\vec{a}|=|\vec{b}|$ (d) $|\vec{b}|=2|\vec{a}|$

QNo150: If $4\vec{i}+7\vec{j}+8\vec{k}$, $2\vec{i}+3\vec{j}+4\vec{k}$ and $2\vec{i}+5\vec{j}+7\vec{k}$ are the position vectors of the vertices A, B and C respectively of triangle ABC. The position vector of the point where the bisector of angle A meets :

(a) $\frac{2}{3}(-6\vec{i}-8\vec{j}-6\vec{k})$ (b) $\frac{2}{3}(6\vec{i}+8\vec{j}+6\vec{k})$ (c) $\frac{1}{3}(6\vec{i}+13\vec{j}+18\vec{k})$ (d) $\frac{1}{3}(5\vec{j}+12\vec{k})$

ANSWERS:

1 A	11 C	21 D	31 C	41 D	51 C	61 C	71 B	81 D	91 A	101 A	111 B	121 D	131 C	141 A
2 B	12 B	22 B	32 A	42 C	52 C	62 B	72 B	82 C	92 C	102 A	112 A	122 B	132 B	142 D
3 C	13 C	23 C	33 D	43 D	53 A	63 B	73 B	83 D	93 A	102 B	113 C	123 B	133 B	143 C
4 C	14 B	24 D	34 A	44 D	54 D	64 A	74 C	84 D	94 C	104 C	114 A	124 B	134 A	144 A
5 C	15 A	25 C	35 C	45 D	55 A	65 A	75 B	85 B	95 B	105 D	115 A	125 A	135 A	145 C
6 A	16 C	26 D	36 C	46 C	56 C	66 B	76 C	86 A	96 B	106 D	116 D	126 A	136 B	146 C
7 B	17 A	27 D	37 C	47 A	57 A	67 B	77 D	87 A	97 C	107 C	117 B	127 A	137 B	147 D
8 C	18 B	28 B	38 A	48 C	58 B	68 A	78 D	88 A	98 B	108 B	118 C	128 A	138 A	148 A
9 A	19 D	29 D	39 B	49 C	59 B	69 B	79 C	89 B	99 A	109 A	119 B	129 A	139 A	149 A
10 B	20 A	30 B	40 C	50 A	60 B	70 B	80 A	90 A	100 A	110 A	120 A	130 B	140 B	150 C