MATHEMATICS

LECTURE - 1 : VECTORS

Assignment-1

1. The vector $\hat{i}+x\hat{j}+3\hat{k}$ is rotated through an angle θ and doubled in magnitude, then it becomes $4\hat{i}+(4x-2)\hat{j}+2\hat{k}$. The sum of all possible values of x is

(A) $\frac{4}{3}$ (B) $\frac{7}{3}$ (C) $\frac{2}{3}$ (D) 2

2. If $\vec{r}=3\hat{i}+2\hat{j}-5\hat{k}$, $\vec{a}=2\hat{i}-\hat{j}+\hat{k}$, $\vec{b}=\hat{i}+3\hat{j}-2\hat{k}$ and $\vec{c}=-2\hat{i}+\hat{j}-3\hat{k}$ such that $\vec{r}=l\vec{a}+m\vec{b}+n\vec{c}$, then

(A) $m,\frac{l}{2}$, n are in A.P (B) l,m,n are in A.P (C) l, m, n are in H.P (D) m, l, n are in G.P

3. If vectors $p\hat{i}+3\hat{j}+4\hat{k}$ and $\sqrt{q}\,\hat{i}+5\hat{k}$ are equal in magnitude where $p, q\geq 0$, then number of order pair of (p,q) are

(A) 0 (B) 2 (C) 4 (D) infinite

4. If O is the circumcentre and P the orthocentre of ΔABC, then $\overrightarrow{PA}+\overrightarrow{PB}+\overrightarrow{PC}=$

(A) $\overrightarrow{PO}$ (B) $2\overrightarrow{PO}$ (C) $3\overrightarrow{PO}$ (D) $4\overrightarrow{PO}$

5. If $\vec{a},\vec{b},\vec{c}$ are position vectors of vertices A, B, C of ΔABC. If $\vec{r}$ is position vector of a point P such that $\left(|\vec{b}-\vec{c}|+|\vec{c}-\vec{a}|+|\vec{a}-\vec{b}|\right)\vec{r}=|\vec{b}-\vec{c}|\vec{a}+|\vec{c}-\vec{a}|\vec{b}+|\vec{a}-\vec{b}|\vec{c}$ then the point P always

(A) centroid of ΔABC (B) Orthocentre of ΔABC

(C) circumcentre of ΔABC (D) incentre of ΔABC

6. ABCD is a parallelogram. L is a point on BC which divides BC in the ratio 1 : 2. AL intersects BD at P. M is a point on DC which divides DC in the ratio 1 : 2 and AM intersects BD at Q.

i. Point P divides AL in the ratio

(A) 5 : 3 (B) 2 : 3 (C) 3 : 1 (D) 2 : 1

ii. Point Q divides DB in the ratio

(A) 1 : 2 (B) 1 : 3 (C) 2 : 3 (D) 3 : 4

iii. PQ : DB is equal to

(A) 2 : 3 (B) 1 : 3 (C) 1 : 2 (D) 3 : 4

7. Let $\overrightarrow{AB} = \vec{a}$ & $\overrightarrow{BC} = \vec{b}$ form the consecutive sides of a regular hexagon $ABCDEF$. then match

Column-I	**Column-II**
A) If $\overrightarrow{CD} = x\vec{a} + y\vec{b}$, then	P) x = – 2
B) If $\overrightarrow{CE} = x\vec{a} + y\vec{b}$, then	Q) x = – 1
C) If $\overrightarrow{AE} = x\vec{a} + y\vec{b}$, then	R) y = 1
D) If $\overrightarrow{BE} = x\vec{a} + y\vec{b}$, then	S) y = 2