**ASSIGNMENT NO.- 12[Ch-10(Vector Algebra)]**

**Class -XII**

1. If $\vec{a}=\hat{i}+2\hat{j}-\hat{k}$ and $\vec{b}=3\hat{i}+\hat{j}-5\hat{k}$,find a unit vector in the directon of $\vec{a}-\vec{b}$.

2. Find a unit vector parallel to the sum of the vectors $\hat{i}+\hat{j}+\hat{k}$ and $2\hat{i}-3\hat{j}+5\hat{k.}$

3. If the points with position vectors $10\hat{i}+3\hat{j } , 12\hat{i}-5\hat{j} $and $λ\hat{i}+11\hat{j}$ are collinear,find the value

 of λ.

4. Find the projection of the vector $\vec{a}=2\hat{i}+3\hat{j}+3\hat{k}$ on the vector $\vec{b}=2\hat{i}+2\hat{j}+\hat{k}.$

5. Find the angle between the vectors $\vec{a}=3\hat{i}-2\hat{j}+\hat{k}$ and $\vec{b}=\hat{i}-2\hat{j}-3\hat{k}$.

6. The scalar product of the vector $\vec{a}=\hat{i}+\hat{j}+\hat{k}$ with a unit vector along the sum of vectors

$ \vec{b}=2\hat{i}+4\hat{j}-5\hat{k}$ and $\vec{c}=λ\hat{i}+2\hat{j}+3\hat{k}$ is equal to one.Find the value of λ and hence find the unit

 vector along $\vec{b}+\vec{c}$.

7. If the points $\left(-1,-1,2\right),(2,m,5)$ and $(3,11,6)$ are collinear,find the value of $m.$

8. Find a vector of magnitude 5 units and parallel to the resultant of vectors $\vec{a}=2\hat{i}+3\hat{j}-\hat{k}$ and $ \vec{b}=\hat{i}-2\hat{j}+\hat{k.}$

9. Find λ,for which $\vec{a}=λ\hat{i}-\hat{j}+5\hat{k}$ and $\vec{b}=3\hat{i}+4\hat{j}-\hat{k}$ are orthogonal.

10. Find the value of $p$,if $\left(2\hat{i}+6\hat{j}+27\hat{k}\right)×\left(\hat{i}+3\hat{j}+p\hat{k}\right)=\vec{0}$.

11. If $\left|\vec{a}\right|=4,\left|\vec{b}\right|=3$ and $\vec{a}.\vec{b}=6\sqrt{3}$,then find the value of $\left|\vec{a}×\vec{b}\right|.$

12. Find a unit vector perpendicular to both $\vec{a}$ and $\vec{b}$,where $\vec{a}=\hat{i}-2\hat{j}+3\hat{k}$ and and

 $ \vec{b}=\hat{i}+2\hat{j}-\hat{k.}$

13. Find the angle between two vectors $\vec{a}$ and $\vec{b}$,if $\left|\vec{a}×\vec{b}\right|=\vec{a}.\vec{b} $.

14. Find the area of the parallelogram determined by the vectors : $3\hat{i}+\hat{j}-2\hat{k}$ and $\hat{i}-3\hat{j}+4\hat{k.}$

15. Prove that in any triangle ABC , $\cos(A=\frac{b^{2}+c^{2}-a^{2}}{2bc})$ where $a,b,c $are the magnitudes of the sides

 opposite to the vertices A,B,C respectively.

16. The volume of a parallelopiped whose edges are represented by $-12\hat{i}+λ\hat{k} $ ,3$\hat{j}-\hat{k}$ ,

 $2\hat{i}+\hat{j}-15\hat{k}$ is 546.Find the value of λ.

17. If the edges $\vec{a}=-3\hat{i}+7\hat{j}+5\hat{k} ,\vec{b}=-5\hat{i}+7\hat{j}-3\hat{k} $and $\vec{c}=-7\hat{i}-5\hat{j}-3\hat{k}$ meet at a vertex ,

 find the volume of the parallelopiped.

18. Find the volume of tetrahedron whose vertices are: $A\left(-2,1,0\right), B\left( 1,2,1\right), C(2,1,4)$ and $D\left(0,1,0\right).$

19. If $\vec{a}=2\hat{i}+2\hat{j}+3\hat{k} ,\vec{b}=-\hat{i}+2\hat{j}+\hat{k} $and $\vec{c}=3\hat{i}+\hat{j}$ are such that $\vec{a}+λ\vec{b}$ is perpendicular to $\vec{c}$

 ,then find the value of λ.

20. Vectors $\vec{a} ,\vec{b} $and $\vec{c}$ are such that $\vec{a}+\vec{b}+\vec{c}=\vec{0}$ and $\left|\vec{a}\right|=3,\left|\vec{b}\right|=5$ and $\left|\vec{c}\right|=7$,find the angle

 between $\vec{a} $and $\vec{b}.$