

**Class XII**  
**Chapter 10-Vector**

**WORKSHEET (STANDARD)**

A. Answer the following

1. If  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  are coplanar then find the value of  $[\vec{a} \vec{b} \vec{c}]$
2. Write the direction cosines of the vector  $-2\hat{i}+\hat{j}-5\hat{k}$
3. Write a unit vector in the direction of  $\vec{a} = 2\hat{i}-6\hat{j} + 3\hat{k}$
4. If  $|\vec{a}|=3$  and  $-2 \leq k \leq 2$ , then what can be said about the vector  $k\vec{a}$
5. If  $\vec{p} = 5\hat{i}+\alpha\hat{j}-3\hat{k}$  and  $\vec{q} = \hat{i}+3\hat{j}-5\hat{k}$ , then find the value of  $\alpha$  so that  $\vec{p}+\vec{q}$  and  $\vec{p}-\vec{q}$  are perpendicular vectors.
6. If  $|\vec{a} + \vec{b}|=60$ ,  $|\vec{a} - \vec{b}|=40$  and  $|\vec{b}| =46$ , find  $|\vec{a}|$
7. If  $\vec{a}$  and  $\vec{b}$  are non-collinear vectors, then find the value of  $\alpha$  for which the vectors  $\vec{u}=(\alpha-2)\vec{a}+\vec{b}$  and  $\vec{v}=(2+3\alpha)\vec{a}-3\vec{b}$  are collinear
8. If  $\vec{p}$  and  $\vec{q}$  are non-collinear unit vectors and  $|\vec{p} + \vec{q}|=\sqrt{3}$ , then find the value of  $(2\vec{p}-3\vec{q}) \cdot (3\vec{p}+\vec{q})$ .
9. If  $3\vec{p}+2\vec{q}=\hat{i}+\hat{j} + \hat{k}$  and  $3\vec{p}-2\vec{q} = \hat{i}-\hat{j} - \hat{k}$ , then find the angle between  $\vec{p}$  and  $\vec{q}$
10. If  $|\vec{a} \times \vec{b}| = \vec{a} \cdot \vec{b}$ , then find the angle between  $\vec{a}$  and  $\vec{b}$

B. Fill in the blanks

11. The area of a triangle whose adjacent sides are  $\vec{a} = \hat{i} + 4\hat{j} - \hat{k}$  and  $\vec{b} = \hat{i} + \hat{j} + 2\hat{k}$  is equal to .....
12. The volume of parallelepiped whose edges are represented by  $\vec{a} = \hat{i} + 4\hat{j} - \hat{k}$ ,  $\vec{b} = \hat{i} + 4\hat{j} - \hat{k}$  and  $\vec{c} = \hat{i} + 4\hat{j} - \hat{k}$  is equal to .....
13. Projection of  $\hat{i} - 2\hat{j} + \hat{k}$  on  $4\hat{i} - 4\hat{j} + 7\hat{k}$  is equal to .....
14. If a vector has direction  $\vec{a}$  has direction cosines  $l, m, n$ , then unit vector along  $\vec{a}$  is equal to .....
15. Distance between two points whose position vectors are  $3\hat{i}+\hat{j}-2\hat{k}$  and  $\hat{i}-3\hat{j}+2\hat{k}$  is equal to .....
16. If  $\vec{a}$  and  $\vec{b}$  are mutually perpendicular vectors, then the value of  $\frac{|\vec{a}+\vec{b}|}{|\vec{a}-\vec{b}|}$  is equal to .....
17. A unit vector in xy- plane makes an angle of  $45^\circ$  with the vector  $\hat{i}+\hat{j}$  and an angle of  $60^\circ$  with the vector  $3\hat{i}+\hat{j}$  is equal to .....
18. Let  $\vec{a}$  and  $\vec{b}$  be two unit vectors. Let  $\alpha$  be the angle between them, the vector  $\vec{a}+\vec{b}$  is a unit vector if the value of  $\alpha$  is equal to .....



3. Write a unit vector in the direction of  $\vec{a} = 2\hat{i} - 6\hat{j} + 3\hat{k}$
4. If  $|\vec{a}| = 3$  and  $-2 \leq k \leq 2$ , then what can be said about the vector  $k\vec{a}$
5. If  $\vec{p} = 5\hat{i} + \alpha\hat{j} - 3\hat{k}$  and  $\vec{q} = \hat{i} + 3\hat{j} - 5\hat{k}$ , then find the value of  $\alpha$  so that  $\vec{p} + \vec{q}$  and  $\vec{p} - \vec{q}$  are perpendicular vectors.
6. If  $|\vec{a} + \vec{b}| = 60$ ,  $|\vec{a} - \vec{b}| = 40$  and  $|\vec{b}| = 46$ , find  $|\vec{a}|$
7. If  $\vec{a}$  and  $\vec{b}$  are non-collinear vectors, then find the value of  $\alpha$  for which the vectors  $\vec{u} = (\alpha - 2)\vec{a} + \vec{b}$  and  $\vec{v} = (2 + 3\alpha)\vec{a} - 3\vec{b}$  are collinear
8. If  $\vec{p}$  and  $\vec{q}$  are non-collinear unit vectors and  $|\vec{p} + \vec{q}| = \sqrt{3}$ , then find the value of  $(2\vec{p} - 3\vec{q}) \cdot (3\vec{p} + \vec{q})$ .
9. If  $3\vec{p} + 2\vec{q} = \hat{i} + \hat{j} + \hat{k}$  and  $3\vec{p} - 2\vec{q} = \hat{i} - \hat{j} - \hat{k}$ , then find the angle between  $\vec{p}$  and  $\vec{q}$
10. If  $|\vec{a} \times \vec{b}| = \vec{a} \cdot \vec{b}$ , then find the angle between  $\vec{a}$  and  $\vec{b}$

B. Fill in the blanks

11. The area of a triangle whose adjacent sides are  $\vec{a} = \hat{i} + 4\hat{j} - \hat{k}$  and  $\vec{b} = \hat{i} + \hat{j} + 2\hat{k}$  is equal to .....
12. The volume of parallelepiped whose edges are represented by  $\vec{a} = \hat{i} + 4\hat{j} - \hat{k}$ ,  $\vec{b} = \hat{i} + 4\hat{j} - \hat{k}$  and  $\vec{c} = \hat{i} + 4\hat{j} - \hat{k}$  is equal to .....
13. Projection of  $\hat{i} - 2\hat{j} + \hat{k}$  on  $4\hat{i} - 4\hat{j} + 7\hat{k}$  is equal to .....
14. If a vector has direction  $\vec{a}$  has direction cosines  $l, m, n$ , then unit vector along  $\vec{a}$  is equal to .....
15. Distance between two points whose position vectors are  $3\hat{i} + \hat{j} - 2\hat{k}$  and  $\hat{i} - 3\hat{j} + 2\hat{k}$  is equal to .....
16. If  $\vec{a}$  and  $\vec{b}$  are mutually perpendicular vectors, then the value of  $\frac{|\vec{a} + \vec{b}|}{|\vec{a} - \vec{b}|}$  is equal to .....
17. A unit vector in  $xy$ -plane makes an angle of  $45^\circ$  with the vector  $\hat{i} + \hat{j}$  and an angle of  $60^\circ$  with the vector  $3\hat{i} + \hat{j}$  is equal to .....
18. Let  $\vec{a}$  and  $\vec{b}$  be two unit vectors. Let  $\alpha$  be the angle between them, the vector  $\vec{a} + \vec{b}$  is a unit vector if the value of  $\alpha$  is equal to .....
19. If  $\vec{a} + \vec{b} + \vec{c} = 0$ ,  $|\vec{a}| = 3$ ,  $|\vec{b}| = 5$ ,  $|\vec{c}| = 7$ , then the angle between  $\vec{a}$  and  $\vec{b}$  is equal to .....
20. If  $\vec{a} \times \vec{b} = \vec{a} \times \vec{c}$ ,  $\vec{a} \neq 0$  and  $\lambda$  is any scalar quantity, then the relation between  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  is equal to .....