

# CBSE QUESTIONS

## 1 Vectors and Three-Dimensional Geometry

1. Find the magnitude of each of two vectors  $\vec{a}$  and  $\vec{b}$ , having the same magnitude such that the angle between them is  $60^\circ$  and their scalar product is  $\frac{9}{2}$ .
2. If  $\theta$  is the angle between two vectors  $\hat{i} - 2\hat{j} + 3\hat{k}$  and  $3\hat{i} - 2\hat{j} + \hat{k}$ , find  $\sin \theta$ .
3. Let  $\vec{a} = 4\hat{i} + 5\hat{j} - \hat{k}$ ,  $\vec{b} = \hat{i} - 4\hat{j} + 5\hat{k}$  and  $\vec{c} = 3\hat{i} + \hat{j} - \hat{k}$ . Find a vector  $\vec{d}$  which is perpendicular to both  $\vec{c}$  and  $\vec{b}$  and  $\vec{d} \cdot \vec{a} = 21$ .
4. Find the shortest distance between the lines  
 $\vec{r} = (4\hat{i} - \hat{j}) + \lambda(\hat{i} + 2\hat{j} - 3\hat{k})$  and  $\vec{r} = (\hat{i} - \hat{j} + 2\hat{k}) + \mu(2\hat{i} + 4\hat{j} - 5\hat{k})$
5. Find the distance of the point  $(-1, -5, -10)$  from the point of intersection of the line  $\vec{r} = 2\hat{i} - \hat{j} + 2\hat{k} + \lambda(3\hat{i} + 4\hat{j} + 2\hat{k})$  and the plane  $\vec{r} \cdot (\hat{i} - \hat{j} + \hat{k}) = 5$ .