Exercise 10.1

I. Very Short Answer Type Questions **(1 Mark)**

1. If $\vec{a} = 2\hat{i} + 3\hat{j} - 4\hat{k}$, $\vec{b} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} - 5\hat{j} + \hat{k}$. Find a vector $\vec{r}$ if $\vec{r} = 2\vec{a} + \vec{b} + 3\vec{c}$.
[*Delhi* 2012]

2. If $\vec{a} = 3\hat{i} - \hat{j} + 4\hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$ and $\vec{c} = 2\hat{i} + 4\hat{j} + \hat{k}$. Find the magnitude of a vector $\vec{r} = 2\vec{a} + 3\vec{b} + \vec{c}$.

3. Using the vector method find the length of AB if the coordinates of points A and B are (1, 2, 1) and (3, – 1, 4) respectively.

4. Write the position vector of the point A (2, 1, – 3). Also write it's magnitude.

5. If the two vectors $\vec{a} = 3\hat{i} + y\hat{j} + 2\hat{k}$ and $\vec{b} = 5x\hat{i} - 3\hat{j} + (2z - 4)\hat{k}$ are equal, find the values of *x, y* and *z*.

6. Write the scalar and vector components of the vector $\vec{r} = 2\hat{i} + 3\hat{j} - 7\hat{k}$.

7. There are two points in space A (1, – 1, 1) and B (3, 4, 6). Find the vector $\vec{r} = \overrightarrow{AB}$ and find scalar and vector components of the vector $\vec{r}$.

8. Write a vector which is equal in magnitude of vector $\vec{r} = 3\hat{i} + 2\hat{j} - 5\hat{k}$ but different in direction.

9. Show that the vectors: $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ and $\vec{b} = -4\hat{i} + 6\hat{j} - 8\hat{k}$ are collinear.

10. Write two different vectors having same magnitude.

11. Write two different vectors having same direction.

12. If $\overrightarrow{AB} = 3\hat{i} - \hat{j} + 2\hat{k}$ and coordinates of point A are (0, –2, – 1), find the coordinates of the point B. [*Delhi* 2005]

13. Write all unit vectors in the *xy*-plane.

14. Write a unit vector in *xy*-plane making an angle of 30° with the positive direction of the *x*-axis.

15. Find the angles that the vector $\vec{r} = 2\hat{i} - 3\hat{j} + 6\hat{k}$ makes with positive direction of *x, y* and *z*-axis.

16. Write the value of *p* for which $\vec{a} = 3\hat{i} + 2\hat{j} + 9\hat{k}$ and $\vec{b} = \hat{i} + p\hat{j} + 3\hat{k}$ are parallel vectors.
[*Delhi* 2009, *AI* 2014]

17. If coordinates of two points are P(1, 5, 4) and Q(4, –1, –2), find direction ratios of the vector $\overrightarrow{PQ}$. [*A.I.* 2008]

18. Write direction cosines of a line equally inclined to the positive direction of three coordinates axes.
vector PQ . [*A.I.* 2008]