TIME:1HR. **M.MARKS:30**

CHAPTER TEST

CLASS: XII

Vectors & Three Dimensional Geometry

1. A particle is being acted upon by the force $\vec{F} = \hat{i} + 2\hat{j} + \hat{k}$ acting on a particle, if the particle is displaced from the point with position vector $2\hat{i} + \hat{j} + \hat{k}$ to the point with position vector $3\hat{i} + 2\hat{j} + 4\hat{k}$. Find the work done. 3

2. If $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, show that $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$. 3

3. Find the vector equation of a line passing through a point with position vector $2\hat{i} - \hat{j} + \hat{k}$ parallel to the line joining the points $-\hat{i} + 4\hat{j} + \hat{k}$ and $\hat{i} + 2\hat{j} + 2\hat{k}$. Also find cartesian equation of this line. 3

4. Find the equation of a plane through the point $(-1, -1, 2)$ and perpendicular to the planes $3x + 2y - 3z = 1$ and $5x - 4y + z = 5$ 3

5. Prove by vector method that $\cos(\alpha + \beta) = \cos\alpha \cos\beta - \sin\alpha \sin\beta$ 4

6. For any three vectors $\vec{a}, \vec{b}, \vec{c}$, prove that $\left[\vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a}\right] = 2\left[\vec{a}\ \vec{b}\ \vec{c}\right]$ 4

7. Find the radius of the circular section of the sphere $x^2 + y^2 + z^2 = 49$ by the plane $2x + 3y - z - 5\sqrt{14} = 0$ 4

8. Find the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ 6