SELF ASSESSMENT TEST -10
CLASS 10+2
THREE DIMENSIONAL GEOMETRY

1.Find the direction cosines of the line, which makes equal angles with the co-ordinate axes.

2.If $\alpha, \beta\, and\ \ \gamma$ are direction- angle of a line, prove that $\cos 2\alpha + \cos 2\beta + \cos 2\gamma + 1 = 0$.

3.If $\alpha, \beta\, and\ \ \gamma$ are the direction angles of a line , prove that $\sin^2\alpha + \sin^2\beta + \sin^2\gamma = 2$.

4.Find the eqn of the line passing through the pt $2\hat{i} + 3\hat{j} - \hat{k}$ and perpendicular to the lines $\vec{r} = (2\hat{i} - \hat{j}) + \lambda(2\hat{i} + \hat{j} - 3\hat{k})$ & $\vec{r} = (3\hat{i} - 2\hat{j} + \hat{k}) + \mu(\hat{i} + \hat{j} + \hat{k})$.

5.The Cartesian eqn of a line are 3x+1= 6y-2=1-z, find the fixed pt through which it passes, its d.r's and also find its vector eqn

6.Find the eqn of the perpendicular from the pt (3,-1,11) to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$.

7.Find the image of the pt (1,6,3) in the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$.

8.The vector eqns of two lines are $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$ and $\vec{r} = 2\hat{i} + 4\hat{j} + 5\hat{k} + \mu(3\hat{i} + 4\hat{j} + 5\hat{k})$. Find the S.D. between these lines.

9.Find the S.D. between the lines given by $\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 6\hat{k})$ and $\vec{r} = 3\hat{i} + 3\hat{j} - 5\hat{k} + \mu(2\hat{i} + 3\hat{j} + 6\hat{k})$.

10.Find whether the lines $\vec{r} = \hat{i} - \hat{j} - \hat{k} + \lambda(2\hat{i} + \hat{j})$ and $\vec{r} = 2\hat{i} - \hat{j} + \mu(\hat{i} + \hat{j} - \hat{k})$ intersect or not .If intersecting, find their pt of intersection.

11.Determine whether or not the pairs of lines $\vec{r}=\hat{i}-2\hat{j}+3\hat{k}+\lambda(-\hat{i}+\hat{j}-2\hat{k})$ and $\vec{r}=\hat{i}-\hat{j}-\hat{k}+\mu(\hat{i}+2\hat{j}-2\hat{k})$ intersect.

12.Find the distance between the following parallel planes $\vec{r}.(2\hat{i}-3\hat{j}+6\hat{k})=5$ and $\vec{r}.(6\hat{i}-9\hat{j}+18\hat{k})+20=0$.

13.Find the angle between two planes 2x+y-2z=5 and 3x-6y-2z=7.

14.Find the eqn of the plane through the pts (1,0,-1);(3,2,2) and parallel to the line $\frac{x-1}{1}=\frac{y-1}{-2}=\frac{z-2}{3}$.

15Find the eqn of the plane through the pts (1,-1,2);(2,-2,2) and perpendicular to the plane 6x-2y+2z=9.

16.Find the eqn of plane through the pts (2,1,0),(3,-2,-2) & (3,1,7).

17.Find the eqn of plane passing through (1,-1,2) and perpendicular to the planes 2x +3y-2z=5 , x+2y-3z=8.

18.Show that four pts (2,2,-1),(3,4,2),(7,0,6) & (0,4,-3) are coplanar.

19.Find the eqn of plane passing through the intersection of the planes x+2y+3z+5=0 & 2x-4y+z-3=0 and the pt (0,1,0).

20.Find the eqn of plane through the line of intersection of the planes x+y+z-1=0 & 2x+3y+4z-5=0 and perpendicular to the plane x-y+z=0.

21.Find the image of the pt (3,-2,1) in the plane 3x-y+4z=2.

22.A variable plane is at a constant distance p from the origin and meet the axes in A,B,C resp., then show that locus of the centroid of the triangle ABC is $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{9}{p^2}$.

23.Find the pt of the intersection of the line $\vec{r} = (\hat{i} + 2\hat{j} + 3\hat{k}) + \lambda(2\hat{i} + \hat{j} + 2\hat{k})$ and the plane $\vec{r}.(2\hat{i} - 6\hat{j} + 3\hat{k}) + 5 = 0$.

24.Show that the line $\vec{r} = \hat{i} + \hat{j} + \lambda(2\hat{i} + \hat{j} + 4\hat{k})$ lies in the plane $\vec{r}.(\hat{i} + 2\hat{j} - \hat{k}) - 5 = 0$.

25.Find the eqn of the plane containing the line $\frac{x+1}{2} = \frac{y+1}{-1} = \frac{z-3}{4}$ and perpendicular to the plane x+2y+z-12=0.

26.Find the angle between the line $\frac{x-2}{3} = \frac{y+1}{-1} = \frac{z-3}{-2}$ and the plane 3x+4y+z+5=0.

27.Show that two lines $\frac{x+3}{-3} = \frac{y-1}{1} = \frac{z-5}{5}$ and $\frac{x+1}{-1} = \frac{y-2}{2} = \frac{z-5}{5}$ are coplanar. Also find the eqn of the plane.