INDIAN SCHOOL MUSCAT

DEPARTMENT OF MATHEMATICS

3D GEOMETRY

CLASS-12

1) Find the values of p so that the line $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2} and\ \frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}\ are\ right\ angles.$
2) Find the Shortest Distance Between Two Lines $\vec{r} = \hat{\imath} + \hat{\jmath} + \hat{\lambda}(2\hat{\imath} - \hat{\jmath} + \hat{k}) and\ \vec{r} = 2\hat{\imath} + \hat{\jmath} - \hat{k} + \mu\ (3\hat{\imath} - 5\hat{\jmath} + 2\hat{k})$
3) Find the foot of the perpendicular from the (1,2,3) on the line $\vec{r} = 6\hat{\imath} + 7\hat{\jmath} + 7\hat{k} + \lambda(3\hat{\imath} + 2\hat{\jmath} - 2\hat{k}\ .\ Also\ find\ the\ image$ of the point on the line
4) Find the equation of the plane through the intersection of the planes 3x –y+2z-4=0 and x +y +z-2=0 and passing through the point (2,2,1,)
5) Find the angle between the planes whose vector equations are $\vec{r}.(\hat{\imath} + \hat{\jmath} + \hat{k}) = 6: \vec{r}.(2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}) = -5$
6) Find the angle between the line $\frac{x+2}{3} = \frac{2-y}{2} = \frac{z+3}{2}$ and the plane 2x +3y-z=5
7) Find the distance of a point (3,-2,1) from the plane2x - y +2z+3=0
8) Find the length and the foot of the perpendicular from the point(7,14,5) to the plane 2x +4y-z=2 , also find image point.
9) Find the equation of the plane that contains the point (-1,3,2) and perpendicular to each of the plane x + 2y – 3z = 5 and 3x + 3y -z =0.
10) Show that the lines $\vec{r} = \hat{\imath} + \hat{\jmath} - \hat{k} + \lambda(3\hat{\imath} - \hat{\jmath}) and\ \vec{r} = 4\hat{\imath} - 3\hat{k} + \mu(2\hat{\imath} + 3\hat{k})$ are coplanar. Also find the equation of the plane containing them.
11) Find the coordinates of the point where the line through (3,-4,-5) and (2,-3,1) crosses the 2x +y+z Plane.
12) Show that the lines $\frac{x+3}{-3} = \frac{y-1}{1} = \frac{z-1}{5}\ and\ \frac{x+1}{-1} = \frac{y-2}{2} = \frac{z-5}{5}$ are coplanar. Also find the equation of the plane containing them.
13) Prove that if a plane as the intercepts a,b,c and is at a distance of p units from the origin ,then $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{p^2}$
14) Find the distance of the point (1,-2,3) from the plane x-y+z=5, measured along a line parallel to $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$
15) Find the distance of the point (-2,3,-4) from the line $\frac{x+2}{3} = \frac{2y+3}{4} = \frac{3z+4}{-2}$ measured parallel to the plane 4x +12y -3z +1=0
16) Find the shortest distance between the pairs of lines given by $\vec{r} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k} + \lambda(2\hat{\imath} + 3\hat{\jmath} + 4\hat{k}) and\ \vec{r} = 2\hat{\imath} + 4\hat{\jmath} + 5\hat{k} + \mu(3\hat{\imath} + 4\hat{\jmath} + 5\hat{k})$