REVISION CLASS 3D & VECTORS

WORKSHEET NO: 2

Q.No 1 → Find the equation of the line passing through $(1,-1,0)$ and parallel to the line $\frac{x-2}{3} = \frac{2y+1}{2} = \frac{5-z}{1}$

Ans $\frac{x-1}{3} = \frac{y+1}{1} = \frac{z-0}{1}$

Q.No 2 → Find the equation of the line passing through $(-1,3,-2)$ and perpendicular to the lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x+2}{-3} = \frac{2y-2}{4} = \frac{z+1}{5}$ **Ans** $\frac{x+1}{2} = \frac{y-3}{-7} = \frac{z+2}{4}$

Q.No 3 → Given : point $P(1,2,3)$ and line $\frac{x-6}{3} = \frac{3y-21}{6} = \frac{7-z}{2}$

(1) Find foot of $\perp^r$ from point P to the line

(2) Find length of $\perp^r$ / $\perp^r$ distance of point P from the line

(3) Find equation of $\perp^r$ from point P to the line

(4) Find the Image of point P in the line

(5) Find the length of line segment joining point P and its image

(6) Find equation of the line joining point P & its image

Ans (1) $(3,5,9)$ (2) 7 units (3) $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{6}$ (4) $(5,8,15)$

(5) 14 units (6) same as 3rd part

Q.No 4 → Find the equation of the plane passing through the point $(3,-3,1)$ and normal to the line joining the points $(3,4,-1)$ and $(2,-1,5)$ **Ans** $x+5y-6z+18=0$

Q.No 5 → Find the equation of the plane that bisects the line segment joining the points $(1,2,3)$ and $(3,4,5)$ and is right angled to it **Ans** $x+y+z=9$

Q.N. 6 → Find the equation of the plane passing through the point $(1,1,-1)$ and $\perp^r$ to the planes $x+2y+3z=7$ and $2x-3y+4z=0$ Ans $17x+2y-7z=26$

Q.N. 7 → Find the equation of the plane through the points $(2,1,-1)$ and $(-1,3,4)$ and perpendicular to the plane $x-2y+4z=10$ Ans $18x+17y+4z=49$

Q.N. 8 → Find the equation of the plane passing through the point (a,b,c) and parallel to the plane $\vec{r}\cdot(\hat{i}+\hat{j}+\hat{k})=2$

Ans $x+y+z=a+b+c$

Q.N.S 9 → Find the vector equation of line passing through the point with position vector $2\hat{i}-3\hat{j}-5\hat{k}$ and perpendicular to the plane $\vec{r}\cdot(6\hat{i}-3\hat{j}+5\hat{k})+2=0$

Ans $\vec{r}=(2\hat{i}-3\hat{j}-5\hat{k})+\lambda(6\hat{i}-3\hat{j}+5\hat{k})$

Q.N. 10 → Find the equation of the line passing through the point $(3,0,1)$ and parallel to the planes $x+2y=0$ and $3y-z=0$ Ans $\frac{x-3}{-2}=\frac{y-0}{1}=\frac{z-1}{3}$

Q.N 11 → Find the equation of the plane through the points $(1,0,-1)$ and $(3,2,2)$ and parallel to the line $\frac{x-1}{1}=\frac{y-1}{-2}=\frac{z-2}{3}$ Ans $4x-y-2z=6$

Q.N 12 → Find the equation of the plane passing through the point $(0,7,-7)$ and containing the line $\frac{x+1}{-3}=\frac{y-3}{2}=\frac{z+2}{1}$ Ans $x+y+z=0$

Q.N. 13 → Find the equation of the plane containing two lines $\vec{r} = 2\hat{i} + \hat{j} - 3\hat{k} + \lambda(\hat{i} + 2\hat{j} + 5\hat{k})$ and $\vec{r} = 3\hat{i} + 3\hat{j} + 2\hat{k} + \mu(3\hat{i} - 2\hat{j} + 5\hat{k})$ Ans $\vec{r} \cdot (10\hat{i} + 5\hat{j} - 4\hat{k}) = 37$

Q.N. 14 → Find the equation the plane which contains the lines $\frac{x-4}{1} = \frac{y-3}{-4} = \frac{z-2}{5}$ and $\frac{x-3}{1} = \frac{y+2}{-4} = \frac{z}{5}$

Ans $11x - y - 3z = 35$

Q.N 15 → Find the equation the plane determined by the intersection of the lines $\frac{x+3}{3} = \frac{y}{-2} = \frac{z-7}{6}$ and $\frac{x+6}{1} = \frac{y+5}{-3} = \frac{z-1}{2}$ Ans $2x - z + 13 = 0$

Q.N 16 → Given: point $P(7, 14, 5)$

Plane $2x + 4y - z = 2$

(1) Find foot of $\perp^r$ from point P to the plane
(2) Find the $\perp^r$ distance of point P & the plane
(3) Find equation of $\perp^r$ from point P to the plane
(4) Find the image of point P in the plane
(5) Find the distance / length of line segment joining point P and its image
(6) Find the equation of the line joining point P & its image

Ans (1) $(1, 2, 8)$ (2) $3\sqrt{21}$ units (3) $\frac{x-7}{2} = \frac{y-14}{4} = \frac{z-5}{-1}$
(4) $(-5, -10, 11)$ (5) $6\sqrt{21}$ units (6) Same as part (4)

Q.N. 17 → Find the distance of the point $P(1, 1, 0)$ from the plane $x + 2y + z = 5$ measured parallel

to the line $\frac{x-1}{2} = \frac{y}{3} = \frac{z+1}{2}$ Ans $\frac{\sqrt{17}}{5}$ units

Qn 18 → Find the distance of the point P(0,1,2) from the line $\frac{x-1}{2} = \frac{y+1}{1} = \frac{z}{3}$ measured parallel to the plane $x - y + z = 4$ Ans $\frac{\sqrt{103}}{2\sqrt{2}}$ units

— X —