Question: 1 . (i)Find the distance of (0,0,0,) from the line $\dfrac{x-1}{2}=\dfrac{y-2}{3}=\dfrac{z-3}{4}$.   **[4]**

     (ii) Find the equation of the plane determined by lines :

$$\frac{x-2}{2}=\frac{y-3}{3}=\frac{z-4}{4} \quad \textbf{and} \quad x=y=z.$$ **[6]**

Question: 2 . (i)Let A(1, -1, 2), B(2,-3,1), and C(-1,5,-2) be the points in a plane, find the area of triangle ABC.   **[4]**

     (ii) If the planes $ax+2y+z=4$ **and** $2x-y-az=1$ **are perpendicular to each other, find** a **and also find equation of the line of intersection.**   **[6]**

Question: 3 .(i) Check whether lines $x=1+2t,\ y=2-t,\ z=3t$ **and** $\dfrac{x-2}{3}=\dfrac{1-y}{1}=\dfrac{z+5}{1}$

     intersect, if they intersect find the point of intersection.   **[6]**

     (ii) Identify the surface $4-x^2+2y^2-z^2=0$ **. Find its traces on the coordinate planes and then sketch the surface.**   **[3]**

Question: 4 .(i) Let a curve C be given by $r(t)=t\cos ti+t\sin tj+tk$

     (a)Find a unit tangent vector to C at $t=\frac{\pi}{2}$,

     (b) Find the equation of the tangent line to C at point $\left(0,\dfrac{\pi}{2},\dfrac{\pi}{2}\right)$ **[5]**

     (a)Let $r(t)=ti+t^2j+t^3k$ **be the position vector of moving point P, determine tangential and normal components of acceleration and curvature at the point (1,1,1).**   **[6]**