1. Write your Bilkent student ID number here: | 2 | 1 | 7 | 0 | 3 | 4 | 5 | 6 |
A B C D E F G H

Now fill in the boxes below with the corresponding digits from above.

$$\mathcal{P}: \quad \boxed{2}\,x + \boxed{1}\,y + \boxed{7}\,z = 1$$
A B C

$$L: \quad x = \boxed{3}\,t + \boxed{4}, \quad y = \boxed{5}\,t + \boxed{6}, \quad z = t; \qquad -\infty < t < \infty$$
E F G H

Now find an equation for the plane perpendicular to the plane $\mathcal{P}$ and containing the line L.

Let $\mathcal{P}'$ be the plane containing L and perpendicular to $\mathcal{P}$.

$\vec{n} = 2\vec{i} + \vec{j} + 7\vec{k}$ is normal to $\mathcal{P} \Rightarrow \vec{n}$ is parallel to $\mathcal{P}'$ (1)

$\vec{v} = 3\vec{i} + 5\vec{j} + \vec{k}$ is parallel to $L \Rightarrow \vec{v}$ is parallel to $\mathcal{P}'$ (2)

(1) and (2) $\Rightarrow \vec{n}' = \vec{n} \times \vec{v} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 2 & 1 & 7 \\ 3 & 5 & 1 \end{vmatrix} = -34\vec{i} + 19\vec{j} + 7\vec{k}$

is perpendicular to $\mathcal{P}'$

$P_0(4,6,0)$ is on $L \Rightarrow P_0(4,6,0)$ is on $\mathcal{P}'$

Therefore,

$$-34 \cdot (x-4) + 19 \cdot (y-6) + 7 \cdot (z-0) = 0$$

is an equation for $\mathcal{P}'$.

$$\Downarrow$$

$$34x - 19y - 7z = 22$$