

Find the vector equation of the line which is parallel to the vector  $3\hat{i} - 2\hat{j} + 6\hat{k}$  and which passes through the point  $(1, -2, 3)$ .

**Sol.** Let  $\vec{b} = 3\hat{i} - 2\hat{j} + 6\hat{k}$  and  $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$

So, vector equation of the line, which is parallel to the vector  $\vec{b} = 3\hat{i} - 2\hat{j} + 6\hat{k}$  and passes through the point  $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$  is  $\vec{r} = \vec{a} + \lambda\vec{b}$

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

$$\Rightarrow (x\hat{i} + y\hat{j} + z\hat{k}) - (\hat{i} - 2\hat{j} + 3\hat{k}) = \lambda(3\hat{i} - 2\hat{j} + 6\hat{k})$$

$$\Rightarrow (x-1)\hat{i} + (y+2)\hat{j} + (z-3)\hat{k} = \lambda(3\hat{i} - 2\hat{j} + 6\hat{k})$$