

## 12.11.3.3

**Question :** Find the Cartesian equation of the following planes:

1.  $\mathbf{r} \cdot (\hat{i} + \hat{j} - \hat{k}) = 2$

2.  $\mathbf{r} \cdot (2\hat{i} + 3\hat{j} - 4\hat{k}) = 1$

3.  $\mathbf{r} \cdot [(s - 2t)\hat{i} + (3 - t)\hat{j} + (2s + t)\hat{k}] = 15$

**Solution :**

1.  $x + y - z = 2$

2.  $2x + 3y - 4z = 1$

3.

$$x = (s - 2t), y = (3 - t), z = (2s + t) \quad (1)$$

$$\frac{x - s}{-2} = 3 - y = z - 2s \quad (2)$$

$$(3)$$

So, the cartesian equation is  $2x - 5y - z = 15$