Ques: Find a unit vector that makes an angle of 90°,135°,45°with positive X,Y and Z axis respectively.

Soln : Given,
$\alpha = 90°$,
$\beta = 135°$,
$\gamma = 45°$.

i.e l=cos90°= 0, m=cos135°= $\frac{-1}{\sqrt{2}}$,
n=cos45°= $\frac{1}{\sqrt{2}}$

$$\implies \vec{m} = \cos 90° \cos 135° \cos 45° \qquad (1)$$

Also,we know that,

$$\vec{m} = \frac{\vec{m}}{||m||}$$

$$||m|| = \sqrt{0^2 + (\frac{-1}{\sqrt{2}})^2 + (\frac{1}{\sqrt{2}})^2}$$

$$\implies ||m|| = 1 \qquad (2)$$

Hence,from (1)and(2) we have the unit vector:

$$\vec{m} = 0 \frac{-1}{\sqrt{2}} \frac{1}{\sqrt{2}}$$