The sum of the distinct real values of μ, for which the vectors, $\mu\hat{i}+\hat{j}+\hat{k}$, $\hat{i}+\mu\hat{j}+\hat{k}$, $\hat{i}+\hat{j}+\mu\hat{k}$, are co-planar, is :

(1) -1 (2) 0

(3) 1 (4) 2

Ans $\mu\hat{i}+\hat{j}+\hat{k}$, $\hat{i}+\mu\hat{j}+\hat{k}$, $\hat{i}+\hat{j}+\mu\hat{k}$

$$\begin{vmatrix} \mu & 1 & 1 \\ 1 & \mu & 1 \\ 1 & 1 & \mu \end{vmatrix} = 0$$

$$\mu(\mu^2-1) - 1(\mu-1) + 1(1-\mu) = 0$$

$$\mu^3 - \mu - \mu + 1 + 1 - \mu = 0$$

$$\mu^3 - 3\mu + 2 = 0$$

Sum = 0