Example 18 The projection of vector $\vec{a}=2\hat{i}-\hat{j}+\hat{k}$ along $\vec{b}=\hat{i}+2\hat{j}+2\hat{k}$ is

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) 2 (D) $\sqrt{6}$

Solution (A) is the correct answer. Projection of a vector $\vec{a}$ on $\vec{b}$ is

$$\frac{\vec{a}.\vec{b}}{|\vec{b}|}=\frac{(2\hat{i}-\hat{j}+\hat{k}).(\hat{i}+2\hat{j}+2\hat{k})}{\sqrt{1+4+4}}=\frac{2}{3}.$$