

10. A force on an object of mass 100g is $(10\hat{i} + 5\hat{j})$ N. The position of that object at $t = 2$ s is $(a\hat{i} + b\hat{j})$ m after starting from rest. The value of $\frac{a}{b}$ will be _____

Ans. 2

Sol. $\vec{F} = 10\hat{i} + 5\hat{j}$

$$m = 100 \text{ g} = 0.1 \text{ kg}$$

$$\vec{a} = \frac{\vec{F}}{m} = 100\hat{i} + 50\hat{j}$$

$$\vec{S} = \vec{u}t + \frac{1}{2}\vec{a}t^2 = \frac{1}{2}\vec{a}t^2 \text{ (as } \vec{u} = 0)$$

$$= \frac{1}{2}(100\hat{i} + 50\hat{j})2^2$$

$$= 200\hat{i} + 100\hat{j}$$

$$= a\hat{i} + b\hat{j}$$

$$a = 200, b = 100$$

$$\therefore \frac{a}{b} = 2$$