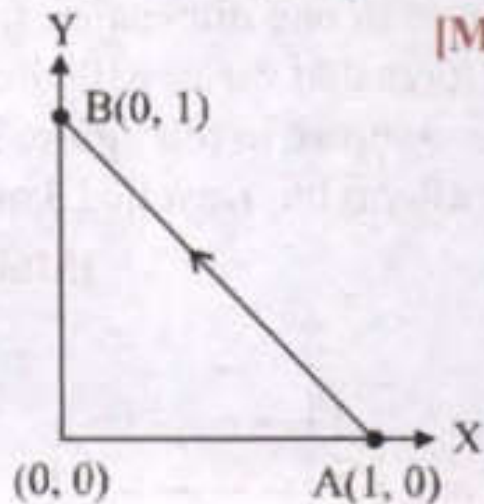3. Consider a force $\vec{F} = -x\hat{i} + y\hat{j}$. The work done by this force in moving a particle from point A(1, 0) to B(0, 1) along the line segment is: (all quantities are in SI units)

(a) 2J   (b) $\dfrac{1}{2}$J   (c) 1J   (d) $\dfrac{3}{2}$J

Ans (c) Work done, $W = \int \vec{F} \cdot \overrightarrow{ds}$

$= \left(-x\hat{i} + y\hat{j}\right) \cdot \left(d \times \hat{i} + dy\hat{j}\right)$

$\Rightarrow W = -\int_{1}^{0} x\,dx + \int_{0}^{1} y\,dy = \left(0 + \dfrac{1}{2}\right) + \dfrac{1}{2} = 1J$