Question 34

A particle of mass 5 kg, initially at rest is acted upon by two forces. One force has a magnitude of $5\sqrt{2}$ newtons acting in the north-west direction, the other force has magnitude of 10 newtons acting in the east direction. After two seconds, the magnitude of the momentum of the particle in kg ms^{-1} is equal to

A. $50\sqrt{2}$

B. $25\sqrt{2}$

C. $10\sqrt{2}$

D. $2\left(2-\sqrt{2}\right)$

E. $2\sqrt{2}$

ANSWER C

$m = 5 \ kg \qquad \underset{\sim}{F_1} = 10\underset{\sim}{i} \qquad \left|\underset{\sim}{F_1}\right| = 10$

and $\underset{\sim}{F_2} = -5\underset{\sim}{i} + 5\underset{\sim}{j} \qquad \left|\underset{\sim}{F_2}\right| = 5\sqrt{2}$

$\underset{\sim}{F_1} + \underset{\sim}{F_2} = 5\underset{\sim}{i} + 5\underset{\sim}{j}$

$\left|\underset{\sim}{F_1} + \underset{\sim}{F_2}\right| = 5\sqrt{2} = ma = 5a$

$a = \sqrt{2} \qquad u = 0 \qquad t = 2$

using $v = u + at \quad \Rightarrow \ v = 2\sqrt{2}$