

Mathematics Questions by Topic

Motion and Force

Answer 10

Source: K19SM2Q17

Question 10

An object of mass 10 kg is initially at rest on a rough plane inclined at an angle of 30° to the horizontal. The object is pulled up the plane by a force of 75 N acting up and parallel to the plane. A frictional force of 11 N acting parallel to the plane, opposes the motion. After the pulling force has acted for 2 seconds, the magnitude of the momentum of the particle in kg ms^{-1} is closest to

- A. 10
- B. 20
- C. 30
- D. 40
- E. 50

ANSWER C

resolving parallel to the plane

$$75 - 11 - 10g \sin(30^\circ) = 10a$$

$$64 - 5g = 64 - 49 = 15 = 10a$$

$$a = \frac{3}{2}, \quad u = 0, \quad t = 2, \quad m = 10$$

$$v = u + at$$

$$v = 0 + \frac{3}{2} \times 2 = 3$$

$$p = mv = 30 \text{ kg ms}^{-1}$$

