

**Mathematics Questions by Topic**

Motion and Force

Answer 29

Source: K12SM2Q20

**Question 29**

A constant force of 10 newtons acts on a mass of 5 kg initially moving at  $1 \text{ ms}^{-1}$ . After the mass has moved a distance of 20 metres, the magnitude of the momentum in  $\text{kgms}^{-1}$ , is equal to

- A. 9
- B. 10
- C. 40
- D. 45
- E. 50

**ANSWER D**

$$F = 10 \text{ newtons} \quad m = 5 \text{ kg} \quad a = \frac{F}{m} \quad a = 2 \text{ ms}^{-2} \quad u = 1 \text{ ms}^{-1} \quad s = 20$$

$$v^2 = u^2 + 2as \Rightarrow v^2 = 1 + 2 \times 2 \times 20 = 81 \quad \text{so } v = 9 \quad \text{so } p = mv = 5 \times 9 = 45 \text{ kgms}^{-1}$$