

Answer on Question #78679 Physics / Other

A Constant force acts on a $m = 5$ kg object and reduces its velocity from $v_i = 7 \frac{\text{m}}{\text{s}}$ to $v_f = 3 \frac{\text{m}}{\text{s}}$ in a time of $t = 3$ s. Calculate:

- The force required
- The Displacement of the object
- Work done on the object
- Power
- The Kinetic energy

Solution:

a)

$$F = ma = m \frac{v_f - v_i}{t} = 5 \times \frac{3 - 7}{3} = -\frac{20}{3} \text{ N} = -6.67 \text{ N}$$

b)

$$S = \frac{v_f + v_i}{2} t = \frac{3 + 7}{2} \times 3 = 15 \text{ m}$$

c)

$$W = F \times S = -\frac{20}{3} \times 15 = -100 \text{ J}$$

d)

$$P = \frac{W}{t} = \frac{100}{3} = 33.3 \text{ W}$$

e)

$$K_f = \frac{mv_f^2}{2} = \frac{5 \times 3^2}{2} = 22.5 \text{ J}$$

$$K_i = \frac{mv_i^2}{2} = \frac{5 \times 7^2}{2} = 122.5 \text{ J}$$

Answers:

- $F = -6.67 \text{ N}$
- $S = 15 \text{ m}$
- $W = -100 \text{ J}$
- $P = 33.3 \text{ W}$
- $K_f = 22.5 \text{ J}, K_i = 122.5 \text{ J}$