

$$m = 50\text{g} \equiv 0.05\text{kg} \quad s = 0.5\text{m} \quad u = 2\text{ms}^{-1} \quad v = 3\text{ms}^{-1}$$

f frictional force

energy at start = energy at end

$$\text{PE}_{\text{start}} + \text{KE}_{\text{start}} = \text{PE}_{\text{end}} + \text{KE}_{\text{end}} + \text{work done}$$

$$mgh + \frac{1}{2}mu^2 = 0 + \frac{1}{2}mv^2 + fS$$

$$(0.05 \times 10 \times 0.433) + (0.5 \times 0.05 \times 4) = (0.5 \times 0.05 \times 9) + 0.5f$$

$$0.2165 + 0.1 = 0.225 + 0.5f$$

$$0.3165 - 0.225 = 0.5f$$

$$f = \frac{0.915}{0.5} = 1.83$$

Ans. frictional force opposing mass movement is 1.83N