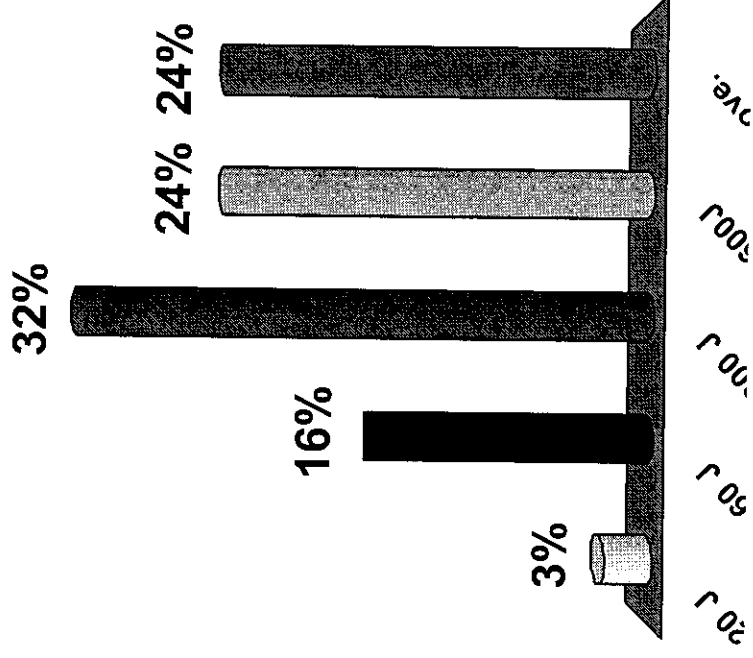


A 2kg mass falls 30 m, starting from rest.
What is its KE at the end of the fall?

- a) 20 J
- b) 60 J
- c) 300 J
- d) 600J
- e) None of the above.



The correct answer is: d) 600 J; as follows

- The **easy way**: Conservation of M.E.
- $ME = PE + KE = \text{Constant} = ME_i = ME_f$
- $ME_i = 0 + mgh_i = 2 \cdot 10 \cdot 30 = 600 \text{ J}$
 $= ME_f = KE_f + 0$ (since $PE_f = mgh_f = 0$).
- i.e., $KE_f = 600 \text{ J}$.
- The **hard way**: $v_f = g \cdot t_f$, & $h = g \cdot t_f^2 / 2$ yield
 $v_f = g \cdot (2h/g)^{1/2} = (2 \cdot g \cdot h)^{1/2}$, so that
 $KE_f = (1/2) \cdot m \cdot v_f^2 = (1/2) \cdot m \cdot \{(2 \cdot g \cdot h)^{1/2}\}^2$
 $= m \cdot g \cdot h = 2 \cdot 10 \cdot 30 = 600 \text{ kg} \cdot \text{m}^2 / \text{s}^2 = 600 \text{ J}$.