Work Example (Slide #3)

#1 Given: $F = 10N$

$d = 2m$

Solve for: W

$W = F \times d$

$= 10 \times 2$

$W = 20\ Nm$ (or 20 J)

#2 Given:

$W = m \times g$

$= 30 \times 10$

$= 300 N$

Solve for: W

$W = F \times d$

$= W \times d$

$= 300 \times 1.6$

$W = 480 J$

Which force does more work? (Slide #4)

$W = F \times d$

[A] $W = 200 \times 4.0 = 800\,J$

[B] $W = 100 \times 5.0 = 500\,J$

[C] $W = 200 \times 5.0 = 1000\,J$

[D] $W = 100 \times 3.0 = 300\,J$

$\therefore$ C Does more work.

Examples (Slide #7)

#1 Given: $m = 3\,kg$

$v = 2\,m/s$

Solve for: E_k

$$E_k = \frac{1}{2} m v^2$$

$$= \frac{1}{2}(3)(2)^2$$

$$E_k = 6\,J$$

Examples (slide #7)

#2 Given: $m = 3kg$

$h = 3m$

Solve for: E_p

$E_p = mgh$

$= 3(10)(3)$

$E_p = 90\ J$

Conversion of Energy (slide #11)

Light Energy

→ Chemical Energy

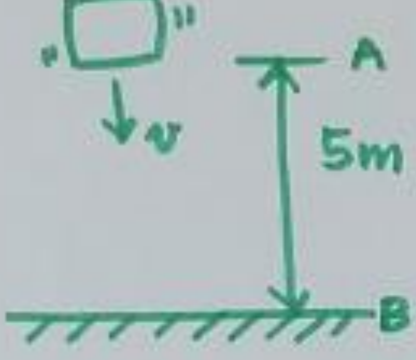
→ Thermal & Light Energies

(slide #12) Answer: **right!**

Example 1 (slide #14)

Given: $m = 3\,kg$

$h = 5\,m$



(a) $E_p = mgh$

$= 3(10)(5)$

$E_p = 150\,J$

(b) $E_{p_A} = E_{k_B}$ ($E_{k_A} = 0$, dropped)

(Conservation of energy)

$\therefore E_{k_B} = 150\,J$

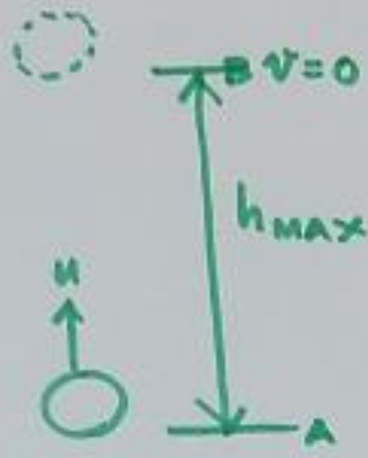
(c) $E_{k_B} = \frac{1}{2} m v_B^2$

$v_B = \sqrt{\frac{2E_{k_B}}{m}}$

$= \sqrt{\frac{2(150)}{3}}$

$v_B = 10\,m/s$

Example 2 (Slide #15)



Given: $m = 60 g$

$= \frac{60}{1000}$

$= 0.060 kg$

$u = 30 m/s$

(a) $E_{K_A} = \frac{1}{2} m u^2$

$= \frac{1}{2}(0.060)(30)^2$

$\boxed{E_{K_A} = 27 J}$

(u stands for initial speed; v stands for final speed)

(b) $\boxed{E_{P_A} = 0}$ (Lowest point, our reference for height measurement)

(c) $E_{P_B} = E_{K_A}$ (conservation of energy)

$\boxed{E_{P_B} = 27 J}$

(d) $E_{P_B} = m g h_{MAX}$

$h_{MAX} = \frac{E_P}{mg}$

$= \frac{27}{(0.060)(10)}$

$\boxed{h_{MAX} = 45 m}$

(about 15 storeys high!)