p276/23-28, 30-33

26. $m = 0.80\,kg$

$v_1 = 0.25\,m/s$

$v_2 = 0$

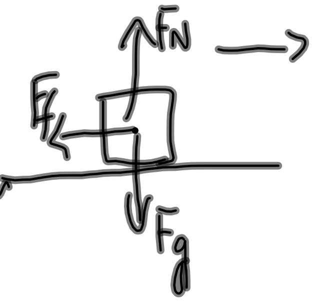
$\Delta d = 0.72\,m$

a) $F_f = ?$

b) W (by F_f)

c) W (by block)

b) Work-energy theorem



$W = \Delta E_k$

$W = E_{k_2} - E_{k_1}$

$W = 0 - \frac{1}{2}mv_1^2$

$W = -\frac{1}{2}(0.80\,kg)(0.25\,\frac{m}{s})^2$

$\boxed{W = -0.025\,J}$

↑ negative work ⇒ decrease in KE

a) $W = F\Delta d\cos\theta$

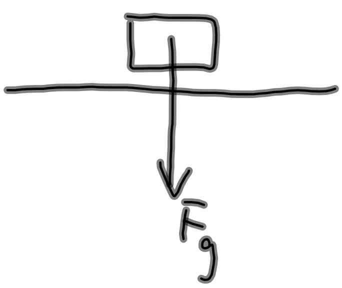
$F = \frac{W}{\Delta d\cos\theta}$

$F = \frac{-0.025\,J}{(0.72\,m)\cos 180^\circ}$

$\boxed{F_f = 0.035\,N}$

↑ the magnitude of the frictional force.... it would be in the neg direction.

c) Work done by the block on the table



§6.4 Power + Efficiency

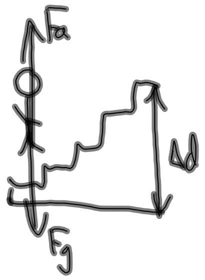
Colton ~ 560N ~ 1.60s

Nic ~ 595N ~ 1.37s

Colton

$\Delta d = 8 \times 18cm = 1.44m$

$F_g = 560N$



$W = F_{\parallel} \Delta d$

$W = (560N)(1.44m)$

$W = 806\,J$

$P = \frac{W}{\Delta t}$

$P = \frac{806.4J}{1.60s}$

$P = 504 \frac{J}{s}$

$P = 504\,W$

$W = Watt = 1\frac{J}{s}$

Nic

$\Delta d = 1.44m$

$F_g = 595\,N$

$W = F_{\parallel} \Delta d$

$W = (595N)(1.44m)$

$W = 857J$

$P = \frac{856.8J}{1.37s}$

$P = 625W$

Power

How fast work is done.

$$P = \frac{W}{\Delta t}$$

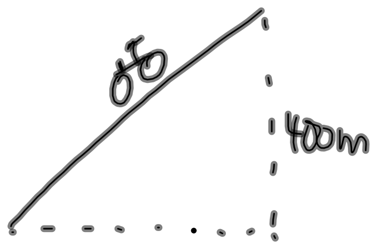
where W is the work done (J)
Δt is the time to do the work (s)
P is the Power (W)

kW·h → $P \cdot \Delta t = W$

→ unit for energy not power!

MP|264

$\Delta t = 1.00\ min$
$m = 60.0\ kg$



a) $W = F_{\parallel}\Delta d$

$W = mg\Delta d$

$W = (60.0\,kg)(9.81\,m/s^2)(4.00\times10^2\,m)$

$W = 2.35\times10^5\,J$

b) $P = \frac{W}{\Delta t}$

$P = \frac{235440\,J}{60.0\,s}$

$P = 3.92\times10^3\,W$

$P = 3.92\,kW$

Efficiency

$$\text{Efficiency} = \frac{E_O}{E_I} \times 100\%$$

MP|269

$E_I = 3.50 \times 10^3 J$

$m = 0.500 kg$
$h = 1.00 \times 10^2 m$
} E_g (E_o) ← output energy

$E_g = mgh$

$E_g = (0.500 kg)(9.81 m/s^2)(1.00 \times 10^2 m)$

$E_g = 490.5 J$

$$\text{Efficiency} = \frac{490.5 J}{3.5 \times 10^3 J} \times 100\%$$

PP|266
PP|270-71

$= 14.0\%$