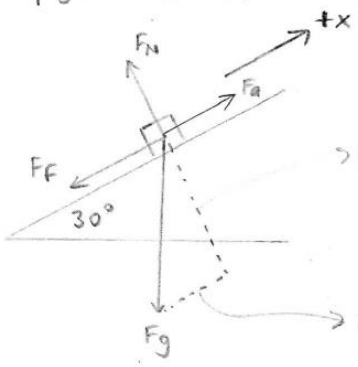
Errata Nelson Physics 12 Chapter 4

Section 4.1 – Review #5d – pg. 170 (Steps shown are incorrect)

4.1 → pg.170 # 5 d)



$F_{gy} = F_g \cos\theta$
$= mg\cos\theta$
$= (24)(9.8)\cos 30°$
$= 203.68\,N$

$F_{gx} = F_g \sin\theta$
$= mg\sin\theta$
$= (24)(9.8)\sin 30°$
$= 117.6\,N$

$W_F = -F_F \Delta d$ → $F_N = F_{gy}$

$W_F = -(\mu_K \cdot F_N)\Delta d$

$W_F = -(0.25 \times 203.68)(16)$

$W_F = -814.72\,J$ [up the ramp]
$= +814.72\,J$ [down the ramp]

$W_{gx} = -F_{gx} \cdot \Delta d$
$= -(117.6)(16)$
$= -1881.6\,J$ [up the ramp]
$= +1881.6\,J$ [down the ramp]

The work done by the worker has to overcome the work done by friction and gravity

$W_A = W_F + W_{gx}$

$W_A = (814.72) + (1881.6)$

$W_A = 2696.32\,J$ [up the ramp]

↓

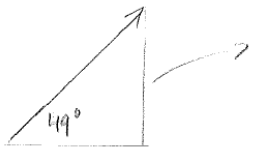
- This is the minimum work done on the crate by the worker
- The W_A cannot be truly calculated unless a F_A (applied force) is given

$W_A = F_A \Delta d \cos\theta$

∴ the total work done is zero in this case assuming the crate moves at a constant velocity

Section 4.5 – Sample Problem #2 – pg.186 (Steps shown are incorrect)

4.5 → pg. 186 Sample Problem 2



$V_{iy} = V_i \sin\theta$
$= (6.2)\sin 49°$
$= 4.679\ m/s$

$V_{ix} = V_i \cos\theta$
$= (6.2)\cos 49°$
$= 4.067\ m/s$

using conservation of energy

a) $E_{Ki} + E_{gi} = E_{KF} + E_{gf}$

$\frac{mv_i^2}{2} + mgh_i = \frac{mv_f^2}{2} + mgh_f$

(0 — Starts at ground) (0 — $v_{fy} = 0\ m/s$ at max height)

$\frac{mv_i}{2} = mgh_f$

$\frac{v_{iy}^2}{2g} = h_f$

$\frac{(4.679)^2}{2 \times 9.8} = h_f$

$1.11\ m = h_f$

b) $E_{Ki} + E_{gi} = E_{KF} + E_{gf}$

0 (starts at ground)

$\frac{mv_i^2}{2} = \frac{mv_f^2}{2} + mgh_f$

$\frac{(4.679)^2}{2} = \frac{v_f^2}{2} + (9.8)(0.82)$

$10.946 = \frac{v_f^2}{2} + 8.036$

$(10.946 - 8.036) \times 2 = v_f^2$

$\sqrt{5.82} = v_f$

$2.41\ m/s = v_f$

using projectile motion

• assuming the bullfrog lands ground to ground

$H_{max} = \frac{(v_{sin\theta})^2}{2g}$

$= \frac{(6.2 \sin 49)^2}{2(9.8)}$

$H_{max} = 1.11\ m$