Exercises in Physics
Assignment # 10

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Q1.

$m = 100kg$

$\mu_k = 0.2$

$F_x = 800 \times \cos 30 + 1000 \times \frac{4}{5} = 1492.82N$

$N = mgk = 100 \times 9.81 \times 0.2 = 196.2N$

$1492.82N - 196.2N = 1296.62N$

$a = \frac{F}{m} = 1296.62 \div 100 = 12.966m/s^2$

$v_f = v_i + at$

$0 + 12.966t = 6$

$t = 0.4627s$

$v_i t + \frac{1}{2}at^2 = s$

$0 + \frac{1}{2} \times 12.966 \times 0.4627^2 = s$

$s = 1.38m$

Q2.

$F = ma$

a is constant, a=g

$0.5 \times 9.81 = 4.905N$

$F_x = 5 \times \cos 30 = 4.33N$

$F_y = 5 \times \sin 30 = 2.5N$

$F_{y\_total} = 4.905 - 2.5 = 2.405N$

$a_y = 2.405 \div 0.5 = 4.81m/s^2$

$v_{yi} = 0m/s$

$v_{yf} = v_{yi} + at$

$s = v_i t + \frac{1}{2}at^2$

$0.2 = 0 + \frac{1}{2}4.81t^2$
$t = 0.288s$
$v_{yf} = 0 + 0.288 \times 4.81 = 1.387m/s$

Q4.
$m = 0.8kg$
$G = mg = 0.8 \times 9.81 = 7.84N$
$N_k = ks = 100N \times 0.15m = 15N$
$v_B^2 = v_A^2 + 2as$
$2.5^2 = 0 + 2a \times 0.15$
$a = 20.83m/s^2$
$F = ma = 20.83 \times 0.8 = 16.67N$
$F_{total} = 16.67 + 15 + 7.84 = 39.51N$

$s_y = 0.4 - 0.15 = 0.25m$
$s_x = 0.3m$
$F = 39.51 \div \cos(\tan^{-1}\frac{0.3}{0.25}) = 61.72N$