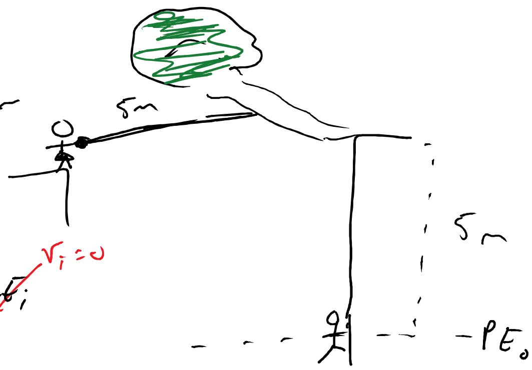
May 9, 2017 9:04 AM

Tarzan is trapped on a cliff Jane must save him



$E_T = PE + KE$

$PE = mgh$

$KE = \frac{1}{2}mv^2$

$E_{T_i} = E_{T_f}$ Conserved System

$E_{T_i} = E_{T_f} + E_{Lost}$ un conserved System

Top

$E_{T_i} = PE_i + KE_i$ ($v_i = 0$)

$= mgh$

$= m(9.8)(5)$

$E_i = 490m$

if energy is lost add E_{lost}

Bottom ($h = 0$)

$E_{T_f} = PE_f + KE_f$

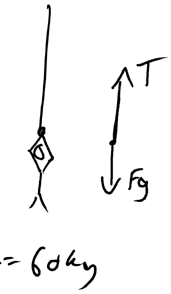
$E_{T_f} = \frac{1}{2}mv^2$

$E_i = E_f$

$490m = \frac{1}{2}mv^2$

$\sqrt{980} = v$

$31.3 m/s = v$



$m = 60kg$

$T - F_g = ma_c$

$T - mg = \frac{mv^2}{r}$

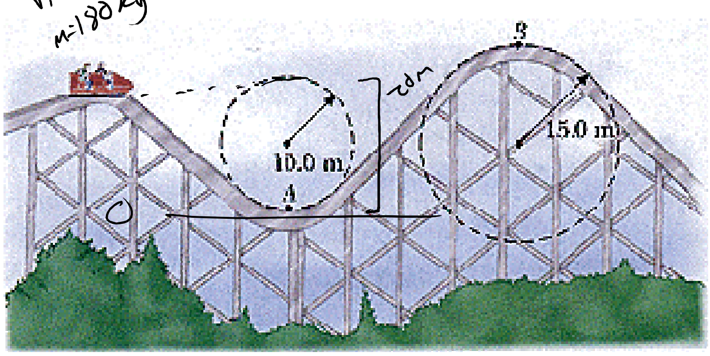
$T = mg + \frac{mv^2}{r}$

$T = (60)(9.8) + (60)\frac{31.2^2}{5}$

$T = 12269N$

$v_i = 5m/s$

$m = 180kg$



Find the Normal force at A if the Cart loses 1500 J of Energy during its motion down the first hill.

$E_i = PE_i + KE_i$

$= mgh + \frac{1}{2}mv_i^2$

$= (180)(9.8)(20) + 90(5)^2$

$E_i = 37530J$

$E_i = E_f + E_{lost}$

$37530 = E_f + 1500$

$-1500 \quad -1500$

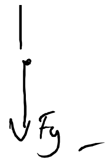
$36030 = E_f$

$36030 = PE_f + KE_f$

$36030 = \frac{1}{2}(180)v_f^2$

$v_f = 20m/s$

$F_N - F_g = ma_c$



$F_N - F_g = ma_c$

$F_N = mg + \frac{mv^2}{r}$

$= (180)(9.8) + \frac{(180)(28)^2}{10}$

$F_N = 8970\,N$

$F_N = 5$ g's ← divide by F_g to find the number of g's a person feels