Calvin

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1a.

$$T_1 = T_2 = T_3 = T_4 = T_5 = \frac{1}{4}(-F_g) = \frac{1}{4}200 * 9.8 = 490N$$

$$T_9 = T_6 = T_7 = T_8 = T_2 + T_3 = 2T_2 = 980N$$

1b.

$$F_{1on2} = F_{2on1} = F_{3on2} + m_2\text{cos}\theta = |9.8\text{cos}15 + 39.2\text{cos}15| = 37.2$$

2a.

$$F_{net} = ma$$
$$T_1 - m_1g = m_1a$$
$$T_1 = m_1a + m_1g = 1(4.67) + 1 * 9.8 = 14.5N$$

$$F_{net} = ma$$
$$m_3g - F_f - m_1g = (m_1 + m_2 + m_3)a$$
$$78.4 - 7.84 - 9.8 = 3a$$
$$a = 4.67\text{m/s}^2$$

2b.

$$W_f = F_f(0.3 - 0) = 2.352$$

$$KE = KE_i + \delta KE = 0 + m_3g * \delta x - m_1g - W_f = 8*9.8*0.3 - 1*9.8*0.3 - 2.352 = 18.2J$$

4c.

$$PE_g = \frac{-mMG}{r} = -1.99 * 10^{20}$$

4d.

$$V_{escape} = \sqrt{\frac{2MG}{r_{moon}}} = 2.38 * 10^3$$

5a.

$$k = \frac{2PE}{\delta x^2} = 2000$$

5b.

$$< F > = \frac{\delta p}{\delta t}$$

$$\delta p = p_f - p_i = mv_f - mv_i = 10^{-3}(15) - 0$$

$$< F > = \frac{0.015}{0.333} = 4.504 * 10^{-2}$$

5c.

$$P = \frac{.5mv^2}{.333} = 0.338W$$

5d.

$$Shoot_{peas} = \frac{PE * peaspersecond}{P} = 221.89 \approx 222peas$$