

Form A: 2. A 3. F 4. E 5. B 6. B

Form B: 2. F 3. E 4. B 5. A 6. B

Form C: 2. E 3. B 4. A 5. F 6. B

Form D: 2. B 3. A 4. F 5. E 6. B

$$7. m = 5.98 \times 10^{24} \text{ kg} \quad R = 6.38 \times 10^6 \text{ m}$$

$$T = \text{one day} = (24)(60)(60) \text{ sec} = 86,400 \text{ sec}$$

$$a_c = \frac{v^2}{R} \quad v = \frac{2\pi R}{T}$$

$$a_c = \frac{(2\pi R/T)^2}{R} = \frac{4\pi^2 R}{T^2}$$

$$a_c = \frac{(4\pi^2)(6.38 \times 10^6)}{(86400)^2} = 0.0337 \text{ m/s}^2$$

$$8. \quad \begin{array}{lll} 1 = \text{truck} & \text{north} = + & m_1 = 10m_2 \\ 2 = \text{SUV} & \text{south} = - & \vec{v}_{01} = +15.0 \text{ m/s} \\ & & \vec{v}_{02} = -30.0 \text{ m/s} \end{array}$$

$$\vec{v}_1 = \vec{v}_2 \quad (\text{inelastic})$$

$$\vec{p}_{01} + \vec{p}_{02} = \vec{p}_1 + \vec{p}_2$$

$$m_1 \vec{v}_{01} + m_2 \vec{v}_{02} = m_1 \vec{v}_1 + m_2 \vec{v}_2 = (m_1 + m_2) \vec{v}$$

$$\vec{v} = \frac{m_1 \vec{v}_{01} + m_2 \vec{v}_{02}}{m_1 + m_2} = \frac{(10m_2)(15) + (m_2)(-30)}{10m_2 + m_2}$$

$$\vec{v} = \frac{120m_2}{11m_2} = \frac{120}{11} = +10.9 \text{ m/s} \quad (+ = \text{north})$$

$$9. \quad v_0 = 0 \quad y_0 = 350 \text{ m} \quad y = 1250 \text{ m} \quad v = ?$$
$$m = 1000 \text{ kg} \quad W = +9.13 \times 10^6 \text{ J} \quad g = 9.80 \text{ m/s}^2$$

$$(PE + KE + W)_{\text{initial}} = (PE + KE)_{\text{final}}$$

$$KE = \frac{1}{2}mv^2 \quad PE = mgy$$

$$mgy_0 + 0 + W = mgy + \frac{1}{2}mv^2$$

$$\frac{1}{2}mv^2 = mgy_0 - mgy + W = mg(y_0 - y) + W$$

$$v = \sqrt{\frac{2[mg(y_0 - y) + W]}{m}}$$

$$v = \left(\frac{(2)[(1000)(9.8)(350 - 1250) + 9,130,000]}{(1000)} \right)^{1/2}$$

$$v = 24.9 \text{ m/s}$$