

### Answers – Week 5

5-1 Potential Energy is the work stored in a system when it is prepared in the presence of a conservative force because in a conservative force work done is independent of the path and determined only by the end points.

5-3 This is a problem in Conservation of Energy.

$$K_f + P_f = K_i + P_i$$

$$K_f = K_i = 0, \quad P_i = 0, \quad P_f = \frac{1}{2}k(\Delta y)^2 + Mg\Delta y$$

$$\text{Hence } \Delta y = -\frac{2Mg}{k}$$

5-5  $P = 0.0525 \text{ J}$

5-7 Distance of closest approach  $\Delta x = 1.14 \times 10^{-13} \text{ m}$

5-9  $C_o = 221.25 \text{ pF}$

$$C_k = 442.5 \text{ pF}$$

5-11  $C_{eq} = \frac{5}{6} \mu\text{F}$

$$Q_1 = 10 \mu\text{C}, \quad V_1 = 10 \text{ V}$$

$$V_2 = V_3 = 2\text{V}, \quad Q_2 = 4 \mu\text{C}, \quad Q_3 = 6 \mu\text{C}$$

5-13 Capacitors are in SERIES.