Answers – Week 7

7-1. Mechanical work. \( \Delta W = F \cdot \Delta S = F \Delta S \cos(F, \Delta S) \).
   (i) 32.8 J
   (ii) Zero
   (iii) Zero

7-3. (i) Zero
   (ii) 49 J
   (iv) -25.5 J

7-5. (i) \( W_{-A\to o} = -\frac{1}{2} F_M A \)
   (ii) \( W_{A\to o} = -\frac{1}{2} F_M A \)

7-7. A force for which the work done is independent of the path and determined only by the end points.

7-9. It is the amount of work stored in a system when it is assembled in the presence of a conservative force. In order to perform the assembling one must apply a force equal but opposite to the conservative force hence change in potential energy
   \[ \Delta P = -F_{cons} \Delta S \]

7-11. The centripetal force is provided by the Earth so
   \[ -\frac{MV^2}{R} \hat{p} = -\frac{GM_E M}{R^2} \hat{p} \]

and Kin. Energy \( \frac{MV^2}{2} = -\frac{GM_E M}{2R} \)

Potential Energy \( P_G = -\frac{GM_E M}{R} \)

7-13. (i) \( 4 \times 10^4 \) J
   (ii) \( 3 \times 10^4 \) J

7-15. 8.4 m/s