

Answers – Week 7

7-1. Mechanical work, $\Delta W = \underline{F} \cdot \underline{\Delta S} = F \Delta S \cos(\underline{F}, \underline{\Delta S})$.

- (i) 32.8 J
- (ii) Zero
- (iii) Zero

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

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

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

$$\Delta P = -\underline{F}_{cons} \cdot \underline{\Delta S}$$

7-11. The centripetal force is provided by the Earth so

$$-\frac{MV^2}{R} \hat{r} = -\frac{GM_E M}{R^2} \hat{r}$$

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

$$\text{Potential Energy } P_G = -\frac{GM_E M}{R}$$

7-13. (i) $4 \times 10^4 \text{ J}$
(ii) $3 \times 10^4 \text{ J}$

7-15. 8.4 m/s