**(3 Hours)** **[Total Marks: 80]**

N.B.:-

1. Question No. 1 is compulsory
2. Attempt any three questions out of remaining five questions.
3. Figures on right hand indicate full marks
4. Assume suitable data if necessary and justify the same.

**Q 1. Answer the following questions.** (5 marks each) **20**

**a.** Draw a typical speed time curve and show there:
1.Notching up Period 2.Acceleration 3. Free-running period 4. Coasting & Braking

**b.** The distance between the lamps from the photometer heads are as follows for equal illumination on both sides of photometer screen.
(i) for standard lamp $l_1$ = 0.8 m. (ii) for lamp under test $l_2$= 1.5 m. The standard lamp is of 100 candle power. Find the candle power of lamp under test.

**c.** What is pinching effect? What is dependent on?
**d.** What are advantages of closed loop system over open loop system?

**Q 2** a. Compare the features of different type of traction systems **10**
**b.**What are different methods of approximation of speed time curves? Derive an expression for distance travelled using quadrilateral approximation method of V(t) curves. **10**

**Q 3** a. Explain the construction and working of fluorescent tube and compare it with tungsten filament lamp? **10**
**b.** Explain briefly various types of lighting systems **10**

**Q 4 a.** Draw and explain functional block diagrams of series, parallel and series-parallel HEV configurations. **10**
**b.** Compare all types of motors required in EV/HEV. **10**

**Q 5 a** Compare Vapour Compression and Vapour Absorption Type System. **10**
**b.** Explain with neat diagram Electric Circuit of Refrigerator. **10**

**Q 6. a.** Classify and Explain different types of Electric Welding. **10**
**b.** Classify and Explain different types of Induction Furnaces. **10**