

(Three Hours)

(80 Marks)

- N.B.:** - (1) Question No.1 is compulsory.  
 (2) **Attempt** any **three** questions out of remaining **five** questions.  
 (3) Assume suitable data if necessary and justify the same.

- Q 1. Answer the following questions. **20**
- What are various types of electric braking used?
  - What is Specific energy consumption and list the factors that affecting it.
  - What are the causes of low power factor?
  - What are the requirements of ideal traction?
- Q 2 a) Explain methods of power factor improvement. **10**
- Q 2 b) An electric train is to have acceleration and braking retardation of 0.8 km/h/s and 3.2 km/h/s respectively. If the ratio of maximum to average speed is 1.3 and time for stops 26 seconds, find schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed-time curve. **10**
- Q 3 a) Give classification of electric welding and explain Butt welding and Spot welding. **10**
- Q 3 b) Derive an expression for trapezoidal speed time curve. **10**
- Q 4 a) What are the different types of track electrification? **10**
- Q 4 b) Explain traction SCADA. **10**
- Q 5 a) Explain the working of Ajax Wyatt vertical core furnace with a neat sketch. **10**
- Q 5 b) Derive an expression for tractive efforts produced at driving axle. Explain the terms dead weight, accelerating weight and adhesive weight. **10**
- Q 6 a) Draw and explain the vapor compression and vapor absorption type refrigeration cycle with their application. **10**
- Q 6 b) What are the requirements for traction motor control? Explain open circuit transition and shunt transition in series parallel control method. **10**