

Duration – 3 Hours

Total Marks - 80

- 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**
- a) Draw typical speed time curve of a train running on main line and explain five distinct periods.
 - b) Write short note on different accessories for track electrification.
 - c) What are the methods of power factor improvement?
 - d) Explain the suitability of DC series motor for traction.
- Q 2 a)** What are the different types of track electrification? **10**
- Q 2 b)** Derive expression for most economical power factor improvement with usual notations. **10**
- Q 3 a)** Analyze the Quadrilateral speed time characteristics and derive an expression for the distance in terms of V_1, V_2, α, β **10**
- Q 3 b)** Draw and Explain the speed control method of DC Motors. **10**
- Q 4 a)** A 100-ton weight train has a rotational inertia of 10%. This train has to be run between two stations that are 3 km apart and has an average speed of 50 km/hr. The acceleration and the retardation during braking are 2 kmphps and 3kmphps, respectively. The percentage gradient between these two stations is 1% and the train is to move up the incline the track resistance is 50 N/ton, then determine: **10**
1. Maximum power at the driving axle.
 2. Total energy consumption.
 3. Specific energy consumption.
- The combined efficiency of the alembic train is 70%. Assume simplified trapezoidal speed-time curve
- Q 4 b)** State necessity of railway signaling & Explain traction SCADA. **10**
- Q 5 a)** What are the terminologies used for refrigeration? Describe vapour absorption system in detail. **10**
- Q 5 b)** What is feeding post and feeding & sectioning arrangement in traction system? **10**
- Q 6 a)** With a neat diagram explain Vertical Core type induction furnace and state advantages of it. **10**
- Q 6 b)** Draw a neat diagram of spot welding machine and explain its working & Give application of resistance welding **10**
