

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VIII Examination May 2012****Subject code: 180902****Subject Name: Electrical Power Utilization****Date: 12/05/2012****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What do you mean by electric drive? What are the various factors which decide the choice of an electric drive for industrial application? Illustrate with example. **07**
- (b) Draw typical speed-time curve for train movement and explain (a) acceleration (b) free running (c) coasting (d) retardation **07**

- Q.2** (a) A 220 V d. c. series motor runs at 1000 r. p. m. and takes 20 A. Combined resistance of armature and series field is 0.4 ohm. Calculate resistance to be inserted in series so as to reduce the speed to 800 r. p. m. assuming torque to vary as square of the speed and linear magnetization curve. **07**
- (b) State with reasons the type of motor suitable for the following: (1) washing machine (2) grinding machine (3) belt conveyer (4) crane and hoist (5) electric traction (6) air conditioner (7) rolling mill **07**

OR

- (b) What are the advantages of regenerative braking? Explain how regenerative braking can be obtained in DC locomotive? **07**
- Q.3** (a) What do you understand by load equalization? Derive the expression for instantaneous motor torque, MOI of the flywheel and the motor slip. State the assumptions made if any. **07**
- (b) A squirrel cage induction motor takes twice full load current and develops half full load torque when switched on with star-delta starter. Find the starting current and starting torque in terms of full load values when started by auto-transformer with 40% tapping. **07**

OR

- Q.3** (a) What do you understand by tractive effort? Derive the expression for the same. **07**
- (b) A 500 tonnes goods train is to be hauled by a locomotive up a gradient of 1 in 40 with an acceleration of 1.5 kmphps. Determine the weight of locomotive and number of axles, if axel load not to exceed 24 tonnes. Co-efficient of adhesion is 0.31, track resistance is 45 N/tonne and effective rotating masses 10% of dead weight. **07**

- Q.4** (a) Describe the construction and operation of an electric arc furnace. **07**
- (b) Explain the method of series-parallel starting of traction motor. Mention its advantages. **07**

OR

- Q.4** (a) Describe various types of resistance welding processes. **07**
- (b) Explain with the circuit diagram the working of a fluorescent lamp. **07**

- Q.5 (a)** State laws of illumination and also derive the equation saying illumination at surface is inversely proportional to the square of the distance from the source. **07**
- (b)** Describe in brief the requirements of good lighting. Enumerate the factors to be considered while designing an indoor lighting scheme. **07**
- OR**
- Q.5 (a)** What are the various applications of electrolysis? State and explain Faraday's laws of electrolysis. **07**
- (b)** Explain electro deposition process and discuss clearly various factors governing the electro deposition process. **07**
