

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- Vth SEMESTER-EXAMINATION – MAY/JUNE - 2012****Subject code: 150906****Date: 07/06/2012****Subject Name: Electrical Power Utilization and Traction****Time: 02:30 pm – 05:00 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) Classify electric drives and state the factors affecting selection of drive. **07**
(b) State the methods of speed control of shunt motor . Explain flux control method with circuit diagram. **07**

- Q.2** (a) A 240volt d.c. shunt motor has a field resistance of 400 Ω and armature resistance of 0.1 Ω . The armature current is 50 Amp and speed is 900 rpm. Calculate additional resistance required in the field to increase the speed to 1000 rpm for the same armature current. Assume a straight line magnetization curve. **07**
(b) Draw speed torque characteristics of following motors. **07**
1. D.C. Shunt motor, 2 D.C. Series motor, 3. Three Phase Induction motor.

OR

- (b) Suggest suitable A.C. and D.C. drives for following applications. Give reasons for the same. **07**
1. Lifts 2. Blower 3. Rolling mills 4. Lathe

- Q.3** (a) Explain design procedure of heating element. **07**
(b) A 30 KW , 400 volts resistance oven is to employ nickel chrome strip 0.254 mm thick for 3 star connected heating elements. If wire temperature is 1100° C and that of charge is 700° C. Estimate suitable width for the strip. Assume emissivity (ϵ) = 0.9, radiating efficiency (η) = 0.5 **07**

OR

- Q.3** (a) State Faraday's laws of electrolysis. Explain power supply for electrolytic processes. **07**
(b) State and explain laws of illumination. **07**

- Q.4** (a) Explain sodium vapour lamp with diagram. **07**
(b) Explain factory lighting. **07**

OR

- Q.4** (a) Explain clearly speed time curves for different services. **07**
(b) A train runs with an average speed of 40 kmph . Distance between stations is 2 km, values of acceleration and retardation are 1.5 km.p.h.s. and 2.5 km.p.h.s. respectively. Find the maximum speed of train assuming trapezoidal speed time curve. **07**

- Q.5** (a) Explain principle and working of a vertical core type furnace. **07**
(b) Explain briefly how you will design lighting scheme. **07**

OR

- Q.5** (a) Explain speed control of 3 phase Induction motor. **07**
(b) Explain regenerative braking used in traction system. **07**
