

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 150906

Date: 09-12-2013

Subject Name: Electrical Power Utilization and Traction

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) Justify the following statement with explanation **07**
(i) D C series motors never start without load
(ii) D C series motors are used where huge starting torque is required
- (b) A 250V shunt motor with armature resistant of 0.5 ohm runs at 600 rpm on full load and takes an armature current of 20 A. If resistant of 1.0 ohm is placed in the armature circuit, find the speed at (i) full load torque (ii) half full load torque. **07**
- Q.2** (a) Explain torque – slip curve of 3 phase induction motor. **07**
(b) State and explain Faraday's laws of electrolysis. **07**
- OR**
- (b) Explain dielectric heating. State applications of dielectric heating. **07**
- Q.3** (a) Define traction, Explain the terms 'dead weight', 'accelerating weight' and 'adhesive weight' in a locomotive. Explain the factors affecting specific energy consumption **07**
(b) A train has schedule speed of 60 km / hour between the stop which are 6 km apart. Determine the crest speed over the run, assuming trapezoidal speed-time curve. The train accelerates at 2 kmphps and retards at 3 kmphps. Duration of stop is 60 seconds. **07**
- OR**
- Q.3** (a) Define electric heating and also explain induction heating. **07**
(b) State and explain laws of illumination. **07**
- Q.4** (a) Explain eddy current heating and its applications. **07**
(b) Explain principle and working of a vertical core type furnace. **07**
- OR**
- Q.4** (a) Classify electric drives and state the factors affecting selection of drive. **07**
(b) Explain street lighting. **07**
- Q.5** (a) Define slip, A 3 phase induction motor is wound for 4 poles and supplied from 50 Hz system. Calculate (i) the synchronous speed (ii) the rotor speed when slip is 4% and (iii) rotor frequency when rotor runs at 600 rpm. **07**
(b) Explain the working of fluorescent tube with the help of circuit diagram **07**
- OR**
- Q.5** (a) Discuss various factors to be considered while designing any lighting scheme **07**
(b) State speed control methods of DC Shunt motor and explain armature voltage control with suitable diagram **07**
