

**GUJARAT TECHNOLOGICAL UNIVERSITY****B.E. Sem-III Examination December 2009****Subject code: 131901****Subject Name: Electrical Machines and Electronics****Date: 17 / 12 / 2009****Time: 11.00 am – 1.30 pm****Instructions:****Total Marks: 70**

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

- Q.1** (a) Explain the working principle of DC generator. Also explain commutator action. **07**  
(b) Explain parallel operation of alternators. **07**

- Q.2** (a) Explain the different methods of speed control of DC shunt and series motor. **07**  
(b) How the rotating magnetic field is produced in three phase induction motor, when three phase supply is fed to it? Explain with the help of phasor diagram. **07**

**OR**

- (b) Explain shaded pole induction motor in detail. **07**

- Q.3** (a) State the types of instrument transformer and derive the EMF equation of single phase transformer. **07**  
(b) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series field and shunt field resistances of 0.05 ohm, 0.03 ohm and 250 ohm respectively. Calculate the generated voltage and the armature current. Allow 2 V brush contact drop. **07**

**OR**

- Q.3** (a) What are the causes of low power factor? Explain various methods of power factor improvement. **07**  
(b) A 500 V shunt motor runs at its normal speed of 250 r.p.m. when the armature current is 200 A. The resistance of armature is 0.12 ohm. Calculate the speed when a resistance is inserted in the field reducing the shunt field to 80 % of normal value and the armature current is 100 A. **07**

- Q.4** (a) List the different equipments used in transformer substation with their function. **07**  
(b) A synchronous condenser absorbing 60 kW is connected in parallel with a factory load of 240 kW having a lagging power factor of 0.8. If the combined load has a power factor of 0.9 lagging, what is the value of the leading kVAR supplied by the motor and at what power factor is it working? **07**

**OR**

- Q.4** (a) Explain the full wave rectifier in detail with the help of circuit diagram and waveforms. **07**  
(b) Compare AC and DC transmission. **07**

- Q.5** (a) State and explain Boolean Laws. **07**  
(b) Describe various types of tariffs. **07**

**OR**

- Q.5** (a) Draw block diagram of 8085 microprocessor. **07**  
(b) Explain inverting and non-inverting comparator. **07**

\*\*\*\*\*