

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Remedial Examination March 2010****Subject code: 131901****Subject Name: Electrical Machines and Electronics****Date: 09 /03 /2010****Time: 03.00 pm – 05.30 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) Sketch and explain the speed-current, speed-torque and torque-current characteristics of a d.c. shunt and series motor. **05**
- (b) Write the difference between d.c. generator and d.c. motor. **09**
A d.c. shunt motor runs at a speed of 1000 rpm on no load taking a current of 6 A from the supply, when connected to 220 V d.c. supply. If full load current is 50 A. Calculate its speed on full load. Assume $R_a=0.30$ ohm, $R_{sh}=110$ ohm.
- Q.2** (a) Explain the construction of a single phase transformer. Also discuss the difference between core type and shell type of construction. **07**
- (b) Explain the operating principle of a three phase induction motor. **07**
- OR**
- (b) Sketch and explain the torque-slip characteristics of a three phase induction motor. **07**
- Q.3** (a) Why single phase induction motors are not self starting? What are the difference between a d.c. motor and a single phase induction motor? **07**
- (b) 3300/110 V, 50 Hz, 60 KVA single phase transformer has iron losses of 600 Watts. Primary and secondary winding resistances are 3.3 ohm and 0.011 ohm. Determine the efficiency of the transformer on full load at 0.8 lag power factor load. **07**
- OR**
- Q.3** (a) What is voltage regulation? How it is defined for an alternator? State the advantages and disadvantages of EMF method. **07**
- (b) The full load power input to 4 pole, 50 Hz three phase induction motor is 50 kw, running at 1440 rpm. Calculate its full load efficiency if stator losses are 1000 watt and friction losses are 650 watt. **07**
- Q.4** (a) Explain the advantages of high transmission voltage. Compare ac transmission line with dc transmission line. **07**
- (b) What is power factor? Discuss the disadvantages of low power factor. **07**
- OR**
- Q.4** (a) Explain half wave rectifier and full wave rectifier. Compare between them. **07**
- (b) Explain the features of 8085. **07**
- Q.5** (a) What is a tariff? Explain the types of tariff. **04**
- (b) What is a substation? Discuss the classification of sub station. **05**
- (c) What should be the KVA rating of a capacitor which would raise the power factor of load of 100 KW from 0.50 lagging to 0.90 lagging. **05**
- OR**
- Q.5** (a) Explain De-Morgan's theorems in Boolean algebra. **05**
- (b) Explain AND, OR, NOT, NOR and NAND logic gates with their truth table. **05**
- (c) Compare indoor substation with outdoor substation. **04**
