*Seat No.: _____* *Enrolment No._____*

# GUJARAT TECHNOLOGICAL UNIVERSITY

**B.E. Sem-III Remedial Examination May 2011**

## Subject code: 131901 Subject Name: Electrical Machines & Electronics

**Date: 30-05-2011** **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)** Derive the generalized torque equation of three phase induction motor using usual notations. Also find the ratios Ts/Tf, Ts/Tm and Tf/Tm in terms of slip. **07**

**(b)** A three phase, 6 pole, 1100 V, 50 Hz induction motor develops a torque of 386 N.m. It is found that e.m.f. induced in rotor winding makes 90 cycles per minute. Loss of torque due to friction is 44 N.m. Copper and iron losses in stator are 600 W and 650 W respectively. Determine (i)Rotor Copper loss (ii)efficiency of the motor **07**

**Q.2** **(a)** A series motor takes 25 A at 410 V and runs at a certain speed for a given load. Armature and field winding resistance is 0.4 ohm total. If the load is such that its torque varies as cube of the speed. Determine the value of a resistance required to be connected in series with armature to reduce the motor speed to 50%. **07**

**(b)** Explain constructional details of D.C. generator. Also give the classification with neat diagrams. **07**

**OR**

**(b)** Explain three point starter for D.C. shunt motor. **07**

**Q.3** **(a)** Describe working principle of shaded pole type single phase induction motor with neat diagram. **07**

**(b)** A three phase, star connected, 48 pole, 50 Hz alternator has 9 slots per pole carrying full pitch two layer winding. Each coil has 4 turns and flux in air gap is 0.05175 wb/pole. **07**
Determine (i) turns/phase (ii) distribution factor
(iii) Induced terminal e.m.f. (iv) Speed.

**OR**

**Q.3** **(a)** Explain the use of C.T. and P.T. for voltage, current and power measurement. **07**

**(b)** Explain the difference between core type and shell type transformer. Also give the comparison for power transformer and distribution transformer. **07**

**Q.4** **(a)** Draw the typical layout of substation. Also state the function of equipment used in substation. **07**

**(b)** Explain merits and demerits of overhead system and underground system for electric supply. Also give the comparison for A.C. and D.C. transmission system. **07**

**OR**

**Q.4** **(a)** Define following Terms. **07**
(i) Demand Factor (ii) Load Factor (iii) Diversity Factor (iv) Connected Load (v) Plant capacity Factor
(vi) Maximum Demand (vii) Average Load

**(b)** Explain various methods used for power factor improvement. **07**

**Q.5** **(a)** What is an OP-Amp? State various applications of OP-Amp. Also explain terms CMRR, PSRR and slew rate for practical OP-Amp. **07**

**(b)** Explain various logic gates with truth table. Simplify the following Boolean expression. **07**

$$Y=(AB+C)(AB+D)$$

**OR**

**Q.5** **(a)** Explain following terms for 8085 microprocessor. **07**
(i) Pin Diagram (ii) Data Transfer instructions
(iii) Arithmetic Instruction (iv) Input/output interfacing.

**(b)** Explain (i) Three phase bridge rectifier **07**
(ii) Multi stage amplifier.

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