Seat No.: _____ Enrolment No._____

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 produces 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**

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