

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 131901**Date: 07-01-2013****Subject Name: Electrical Machines and Electronics****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) Draw and explain the construction of a dc generator. Mention the material used and functions of : 1) Yoke 2) Poles 3) Armature **07**
- (b) Sketch and explain the speed-current, speed-torque and torque-current characteristics of a d.c. shunt and series motor. **07**
- Q.2** (a) An 8 pole d.c Shunt generator with 778 wave connected armature conductors and running at 500 r.p.m supplies a load of 12.5 ohm resistance at terminal voltage of 250 volt. The armature resistance is 0.24 ohm and field resistance is 250 ohm. Find the armature current, the induced emf and flux per pole. **07**
- (b) The armature winding of 200 volt, 4 pole series motor is lap connected. There are 280 slots and each slot has 4 conductors. The armature current is 45 amps and the flux per pole is 18 mWb. The field resistance is 0.3 ohm, the armature resistance 0.5 ohm and the iron and friction losses total 800 watt. The pulley diameter is 0.406 meter. Find the pull in Newton at the rim of the pulley. **07**
- OR**
- (b) Draw and explain the construction of a three point starter for d.c. shunt motor. Explain the function of Hold-on Coil and Overload Coil in it. **07**
- Q.3** (a) Explain the working principle of a transformer. Draw the construction of shell type and core type transformer. **07**
- (b) Explain parallel operation of alternators. **07**
- OR**
- Q.3** (a) Sketch and explain the torque-slip characteristics of a three phase induction motor. **07**
- (b) A 3- ϕ induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate (1) the synchronous speed (2) the rotor speed when slip is 4 % and (3) rotor frequency when rotor run at 600 r.p.m. **07**
- Q.4** (a) Explain the principle and working of Capacitor Start Capacitor Run 1-ph. Induction Motor. What are its advantages and applications? **07**
- (b) What is power factor? Discuss the disadvantages of low power factor. **07**
- OR**
- Q.4** (a) Explain the full wave rectifier in detail with the help of circuit diagram and waveforms. **07**
- (b) With reference to architecture of 8085 microprocessor, explain the following: **07**
- 1) General purpose registers
 - 2) Accumulator
 - 3) ALU

4) Program Counter

- Q.5** (a) What is the purpose of substations in electrical power system? Explain briefly the function of following equipments in a substation: **07**
- 1) Bus-bar
 - 2) Circuit Breaker
 - 3) Isolator
 - 4) Lightning Arrester
 - 5) Insulator
- (b) Compare AC and DC transmission. **07**
- OR**
- Q.5** (a) Explain De-Morgan's theorems in Boolean algebra. **07**
- (b) What is a tariff? Explain the types of tariff. **07**

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