

**GUJARAT TECHNOLOGICAL UNIVERSITY****B.E. Sem-IV Remedial Examination Nov/ Dec. 2010****Subject code: 142401****Subject Name: Electro-Mechanical Energy Conversion – I****Date: 01 /12 /2010****Time: 03.00 pm – 05.30 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) Describe the different characteristics of D.C. Motor with necessary diagrams. **07**  
(b) Write a comprehensive note on losses in D.C. generator. **07**

- Q.2** (a) State the principle of D.C. Motor and obtain the equation of condition for maximum power. **07**  
(b) Classify the generator with respect to their excitation & explain any one of them in brief. **07**

**OR**

- (b) Discuss the construction of D.C. Generator. **07**

- Q.3** (a) Write a short note on a 3-point starter with necessary diagram for D.C. motor operation. **07**  
(b) A 200V D.C. series motor takes 40A when running at 700 rpm. Calculate the speed at which the motor will run and the current taken from the supply. If the field is shunted by a resistance equal to field resistance and the load torque is increased by 50%. Armature resistance =  $0.15\Omega$ . Field resistance =  $0.1\Omega$ . It may be assumed that flux per pole is proportional to field. **07**

**OR**

- Q.3** (a) Discuss various conditions for parallel operation of synchronous generator. **07**  
(b) A 230/230 V, 3kVA transformer gave the following result : **07**  
O.C. test : 230V, 2amp, 100W  
S.C. test : 15V, 13 amp, 120W  
Determine the regulation and efficiency at full load 0.80 p. f. lagging.

- Q.4** (a) Describe the O.C. and S.C. test in transformer with necessary diagrams. **07**  
(b) Explain various speed control methods for 3-phase induction motor. **07**

**OR**

- Q.4** (a) Define efficiency with respect to transformer and derive the equation for maximum efficiency. **07**  
(b) Explain working principle of Induction motor. **07**

- Q.5** (a) A 3-phase induction motor having a 6 pole, star connected stator winding runs on 240V, 50Hz supply. The rotor resistance and standstill reactance are  $0.12\Omega$  and  $0.85\Omega$  / phase. The ratio of stator to rotor turns is 1.8. Full load slip is 4%. Calculate the developed torque at full load, maximum torque and speed at maximum torque. **07**  
(b) Write a detailed note on Schrage motor. **07**

**OR**

- Q.5** (a) Explain voltage regulation of alternator by synchronous impedance method. **07**  
(b) State various types of stepper motor and explain any one in brief. **07**

\*\*\*\*\*