

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) • EXAMINATION – WINTER 2016

Subject Code: 2170909**Date: 25/11/2016****Subject Name: Design of AC Machines****Time: 10.30 AM to 1.30 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) Derive an output equation of 3- Φ induction motor with usual notation. **07**
 (b) What is SCR? Discuss its effects on performance of synchronous machine. **07**
- Q.2** (a) Explain the factors affecting the selection of air gap length for 3- Φ induction motor. **07**
 (b) Discuss the design of field winding of salient pole synchronous machine. **07**
- OR**
- Find the main dimensions, number of turns/phase & stator conductors for a 25KW, 2880RPM, 3- Φ , 50Hz delta connected induction motor has specific magnetic & electric loading are 0.48Tesla & 21000Amp-cond/m respectively, the full load efficiency & voltage=440V power factor are 0.88 & 0.87 respectively. Suggest for overall good design.
- Q.3** (a) What is dispersion coefficient? Show its effect on maximum power factor and overload capacity of three phases. **07**
 (b) What is the role of damper winding in (i) synchronous generator and (ii) synchronous motor? Derive the equation of MMF of damper winding. **07**
- OR**
- Q.3** (a) Discuss the Harmonic torque in 3- ϕ induction motor **07**
 (b) Write the steps and necessary equations for rotor design of an synchronous machine **07**
- Q.4** (a) Explain the factors affecting the choice of specific magnetic loading in case of a induction machine. **07**
 (b) Explain the design of an auxiliary winding of capacitor split phase motor. **07**
- OR**
- Q.4** (a) Explain the factors to be considered while selecting number of armature slots in the design of a synchronous machine. **07**
 (b) Discuss the various types of leakage reactance calculations motor in 1- Φ induction motor. **07**
- Q.5** (a) Discuss the Finite Element Method for design of machine. **07**
 (b) Draw the flow chart for computer design of three phase Induction Motor and also write its advantages **07**
- OR**
- Q.5** (a) Derive an equation of rotor resistance of 3- ϕ slip ring induction motor. **07**
 (b) Explain the design procedure of stator of 1- Φ induction motor. **07**