

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:131701**Date:21/12/2015****Subject Name: Electrical Machine****Time: 2:30pm to 5:00pm****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) Explain equivalent circuit of 1-phase transformer. **07**
 (b) Explain construction features & working principle of 3-phase induction motor. **07**
- Q.2** (a) Explain instrument transformers with their applications. **07**
 (b) What are the elementary concepts of rotating machines? Explain electromechanical conversion. **07**
- OR**
- (b) Explain construction & working principle of 1-phase transformer. **07**
- Q.3** (a) Explain parallel operation of 3-phase transformers with necessary conditions. **07**
 (b) Explain autotransformer. Write its advantages & applications. **07**
- OR**
- Q.3** (a) Explain torque-slip characteristics of 3-phase induction motor. **07**
 (b) A particular load is to be driven at about 700 rpm. What should be the number of poles for a three phase induction motor when (i) $f = 60$ Hz (ii) $f = 50$ Hz? Calculate the actual speed in each case if the rated slip is 4 % . **07**
- Q.4** (a) Explain construction features & working principle of synchronous motor. **07**
 (b) What is hunting? Why damper winding use to reduce hunting? What are the applications of synchronous motor. **07**
- OR**
- Q.4** (a) Why 1-phase induction is not self start? Explain starting methods of 1-phase induction motor. **07**
 (b) Explain different excitation operating systems of synchronous motor. Compare synchronous motor with 3-phase induction motor. **07**
- Q.5** (a) Explain characteristics of different d.c. generators. **07**
 (b) What is armature reaction? What are the methods to improve armature reaction. **07**
- OR**
- Q.5** (a) What is cogging and crawling? Compare slip ring induction motor with squirrel cage induction motor. **07**
 (b) Determine the flux per pole of a six pole d.c. generator required to generate 240 V at 500 rpm. The armature winding has 1080 conductors and are lap connected. **07**
