Seat No.: _____ Enrolment No._____

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 is 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**

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