Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – SUMMER • 2014

Subject Code: 131701 **Date: 28-05-2014**

Subject Name: Electrical Machines

Time: 02.30 pm - 05.00 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)**	Explain working principle of transformer in detail and also derive E.M.F. equation of transformer.	**07**
	(b)	A 25 KVA,1-phase transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Find the full load primary and secondary currents, the secondary e.m.f. and the maximum flux in the core. Neglect leakage drops and no load primary current.	**07**
Q.2	**(a)**	Explain 4-point starter use to start DC motor	**07**
	(b)	For a singly excited system derive the expression for magnetic field energy stored.	**07**
		OR	
	(b)	Develop equivalent circuit of a 1-phase transformer. Draw the phasor diagrams for no-load.	**07**
Q.3	**(a)**	Write and explain the conditions of parallel operation of 3-phase transformer.	**07**
	(b)	Discuss power angle characteristic of an alternator. Also discuss its operation at constant load with variable excitation.	**07**
		OR	
Q.3	**(a)**	Explain how rotating magnetic field is produced in 3-phase induction motor.	**07**
	(b)	Explain crawling and cogging of an induction motor.	**07**
Q.4	**(a)**	What is synchronizing of an alternator? Explain any one method for Synchronizing	**07**
	(b)	Define and state the expressions for (i) Pitch factor. (ii) Distribution factor for alternator.	**07**
		OR	
Q.4	**(a)**	Explain the double revolving field theory for a single-phase induction motor.	**07**
	(b)	Explain different methods of starting 1-phase induction motors.	**07**
Q.5	**(a)**	Write different starters used for 3 phase induction motor and explain any one of them	**07**
	(b)	Explain the Swinburne's test of a d.c. machine for finding losses with necessary diagram	**07**
		OR	
Q.5	**(a)**	With neat diagrams explain the phenomenon of armature reaction in a d.c. machine.	**07**
	(b)	Draw and explain complete vector diagram of 1-phase transformer at lagging power factor	**07**

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