Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER–V (OLD) • EXAMINATION – WINTER 2017

Subject Code: 150802 **Date: 03-11-2017**

Subject Name: Electrical Machines

Time: 10:30 am to 01:00 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 Swinburne's test in D.C. Machine.	**07**
	(b)	Explain demagnetizing and cross magnetizing effects of armature reaction giving neat diagrams.	**07**
Q.2	**(a)**	Draw the circle diagram of a 20 hp, 400 V, 50 Hz, 3-Ø star-connected induction motor from the following test data(line values) No Load test =400 V 9 A p.f.=0.2 SC test =200 V 50 A p.f.=0.4 The stator and rotor copper losses are divided equally in the SC test. From the circle diagram find (1) line current and power factor at full load (2) maximum power output.	**07**
	(b)	Draw the developed view diagram of lap winding for 4 poles and 12 slots armature with two coil sides per slot.	**07**
		OR	
	(b)	Explain the harmonic phenomena in (i)delta connected (ii)star connected winding of three phase transformers	**07**
Q.3	**(a)**	Explain no load test and blocked rotor test on three phase induction motor.	**07**
	(b)	Explain the Scott connection with vector diagram for transformer.	**07**
		OR	
Q.3	**(a)**	Give detail of the cogging and crawling phenomena for three phase induction motor.	**07**
	(b)	Show schematically how a 3-phase transformer can be phased- in with another 3-phase transformer	**07**
Q.4	**(a)**	Describe briefly the methods of controlling speed of an Induction motor.	**07**
	(b)	Explain equivalent circuit of three phase induction motor.	**07**
		OR	
Q.4	**(a)**	Explain principle of stepper motor with its construction.	**07**
	(b)	Explain effects of varying excitation on armature current and power factor in a synchronous motor. Draw "v" curves	**07**
Q.5	**(a)**	Using Double Revolving Field Theory, describe in detail why single phase induction motor is not self starting.	**07**
	(b)	Explain the construction and operation of permanent magnet brush less DC motor.	**07**
		OR	
Q.5	**(a)**	Explain capacitor start and capacitor run single phase induction motor.	**07**
	(b)	Write short note on Universal motor.	**07**

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