Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:160901 **Date:15/12/ 2015**

Subject Name: Electrical Machines- III

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 Brake test to determine efficiency of dc shunt motor ,with advantages and disadvantages of it. **07**

(b) Define armature reaction in Alternator. Explain effect of armature reaction on terminal voltage of alternator at diff. power factor. **07**

Q.2 (a) A 10 KW, 250 V dc shunt motor with an armature resistance of 0.8 ohms and a field resistance of 275 ohms takes 3.91 A when running light at rated voltage and speed. Calculate the efficiency of machine as a generator & motor at full load. **07**

(b) Explain Field's test to find efficiency of dc series machine. **07**

OR

(b) Explain synchronous impedance method to find voltage regulation of an alternator. **07**

Q.3 (a) Find voltage regulation by ZPF method for 5000KVA,6600 V, 3-phase ,50 Hz, star connected alternator at full load and unity p.f. having following test results. Neglect armature resistance. **07**

If amp	32	50	75	100
O.C. terminal voltage ,volts	3100	4900	6600	7500
Line voltage at ZPF F.L current In volts	0	1850	4250	5800

(b) Explain working of Synchronous Induction motor with diagram. **07**

OR

Q.3 (a) A 2000 V, 3- phase, 4 pole, star connected synchronous motor runs at 1500 rpm. The excitation is constant and corresponds to an o.c. voltage of 2000 V. The armature resistance is negligible compared to Sy. Reactance of 3 ohm/ phase. Determine the power input, p.f., and torque developed for an armature current of 200 A. **07**

(b) Why synchronous motor is not self starting ? Explain any one method for starting of it. **07**

Q.4 (a) Explain two reaction theory of salient pole synchronous generator. **07**

(b) Explain effect of change in excitation on one generator performance ,out of two running & connected at Infinite bus. **07**

OR

Q.4 (a) Define SCR of alternator. Explain effect of change in it on performance of m/c. **07**

	(b)	Explain Slip test on synchronous m/c.	**07**
Q.5	**(a)**	Write short note on dc servo motor.	**07**
	(b)	A 5 KVA, 220 V, star connected ,3-phase salient pole alternator with d- axis and q-axis reactance of 12 ohms & 7 ohms resp. ,delivers full load current at unity p.f. . Calculate excitation voltage. Neglect armature resistance.	**07**

OR

Q.5	**(a)**	Explain following : 1. Hunting in synchronous motor. 2. Power –angle ch^{s} of sy. Gen.	**07**
	(b)	Explain working of PMBLDC motor with schematic diagram.	**07**

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