Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – WINTER 2015

Subject Code: 142401 **Date:22/12/2015**

Subject Name: Electro Mechanical Energy Conversion-I

Time: 02:30pm to 05:00pm **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)	Define the following terms: 1. Slip 2. All Day Efficiency 3.Step Angle 4. Pitch Factor 5.Brekdown Torque 6. Critical resistance of DC generator	06
	(b)	Explain the theory of production of rotating field in IM with 3-Φ supply.	08
Q.2	(a)	A 1-Φ 50 Hz transformer is to have no load voltage ratio 6000/250 V. Find the number of turns of each winding if flux in not to exceed 0.05 wb.	06
	(b)	Explain the short circuit test of 1-Φ transformer. State the reason for transformer rating in KVA.	08
		OR	
	(b)	Explain the losses occur in a transformer. Derive the condition for maximum efficiency.	08
Q.3	(a)	Discuss the significant of back emf in DC motor. Explain torque and derive the equation for armature torque of a DC motor.	07
	(b)	List the important performance tests of a DC machine. Explain the direct load test for determine the efficiency using proper arrangement and equation.	07
		OR	
Q.3	(a)	Why starter is necessary in DC Motor? Explain the workingof three point starter with neat diagram.	07
	(b)	List the important performance tests of a DC machine. Explain the Swinburne's test for determine the efficiency using proper arrangement and equation.	07
Q.4	(a)	Explain the working principle of DC generator and derive the equation for generated emf.	07
	(b)	Explain the torque-speed characteristics of 3-Φ IM. Explain the effect of change in supply frequency and voltage on torque and speed.	07
		OR	
Q. 4	(a)	A seperately excited generator, when running at 1000 rpm supplies 200 A at 125 V to a circuit of constant resitance. What will be the curren when the speed is dropped to 800 rpm, if the field current is unaltered? Armature Resistance 0.04Ω , Total brush drop at brushes: 2V, ignore change in armature reaction.	07
	(b)	Define Slip. List various methods of measurement of slip and explain any one in details.	07
Q.5	(a)	Explain the zero power factor methods for finding the voltage regulation of 3-Φ alternator.	07
	(b)	Draw torque slip characteristics and explain effect of change in voltage and frequency on torque.	07
		OR	
Q.5	(a)	List the advantage of stationary armature. Derive the equation of induced emf in an alternator.	07
	(b)	Write a technical short note on Permanent Magnet Stepper Motor.	07