Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 152001

Subject Name: Electromechanical Energy Conversions

Date:20/06/2011 **Time: 10:30 am – 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)**	Give Statement of Biot - Savart Law & Ampere's Law. Explain any one of them.	**07**
	(b)	i) Write equivalent capacitance formula and diagram for, series combination of capacitors & Parallel combination of capacitors.	**04**
		ii) Calculate the capacitance of a parallel-plate capacitor having 20 cm X 20 cm square plates separated by a distance of 1.0 mm.	**03**
Q.2	**(a)**	Derive equation for the capacitance of spherical capacitor.	**07**
	(b)	Explain construction & working of an elementary generator.	**07**
		OR	
	(b)	Explain flux of an electric field through a surface.	**07**
Q.3	**(a)**	Explain electric field due to point charge & electric potential due to point charge.	**07**
	(b)	i) Explain Electric lines of forces.	**04**
		ii) Two charges +10 μC and +20 μC are placed at a separation of 2 cm. Find the electric potential due to the pair of the middle point of the line joining the two charges.	**03**
		OR	
Q.3	**(a)**	A charge Q is placed at the centre of a sphere. Taking outward normal as positive, find the flux of the sphere due to the enclosed charge.	**07**
	(b)	Derive the transfer function of field controlled DC Motor.	**07**
Q.4	**(a)**	Draw and explain all four possible configuration of self excited DC Generator.	**07**
	(b)	Explain typical magnetic circuit with air-gar and its equivalent circuit.	**07**
		OR	
Q.4	**(a)**	Explain Leakage flux & fringing.	**07**
	(b)	State Gauss's Law. Explain Proof of Gauss's law for flux due to internal charge	**07**
Q.5	**(a)**	Explain capacitor starting method of single phase Induction Motor.	**07**
	(b)	Explain rotating magnetic field for 2 phase AC machine.	**07**
		OR	
Q.5	**(a)**	Explain hysteresis losses in detail.	**07**
	(b)	Explain filed energy and co energy for an attracted armature relay excited by DC source.	**07**

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