Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER 1st / 2nd EXAMINATION (OLD SYLLABUS) – SUMMER - 2017

Subject Code: 110005 Date: 07/06/2017

Subject Name: Elements of Electrical Engineering

Time: 2:30 PM to 05:00 PM Total Marks: 70

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the similarity and dissimilarity between electric circuit and magnetic circuit.	**07**
	(b)	Define : (i) RMS value (ii) Average value (iii) Form factor (iv) Peak factor (v) Frequency (vi) Time period (vii) Amplitude	**07**
Q.2	**(a)**	Derive expression for star to delta conversion of resistive network.	**07**
	(b)	Explain Faraday's laws of electromagnetic induction. What is difference between statically induced e.m.f. & dynamically induced e.m.f.?	**07**
Q.3	**(a)**	Explain the phenomena of A.C. through pure capacitor with circuit and vector diagram. Also prove that active power consumption is zero.	**07**
	(b)	Two capacitors having 8 µF and 4 µF are connected in series and charges from a constant voltage of 210 V supply. Calculate: (i) Voltage across each capacitor (ii) Charge on each capacitor	**07**
Q.4	**(a)**	Explain resonance condition in series R-L-C circuit. Also derive equation of resonant frequency.	**07**
	(b)	A circuit consists of a resistance of 4 Ω, inductance of 0.5 H and a variable capacitance in series across a 100 V, 50 Hz supply. Calculate: (1) The value of capacitance to produce resonance (2) The voltage across the capacitance and (3) The Q-factor of the circuit.	**07**
Q.5	**(a)**	Explain the method of measuring 3-phase power by two wattmeter method.	**07**
	(b)	Two watt meters are connected to measure 3-phase power for star connected load and read 5.185 kW and 10.37 kW. The line current 10 A. Calculate: (i) Line and phase voltage (ii) Resistance and reactance per phase.	**07**
Q.6	**(a)**	Derive the relation between line voltage and phase voltage, line current and phase current in delta connection.	**07**
	(b)	Draw and explain the wiring diagram for the staircase wiring.	**07**
Q.7	**(a)**	Classify and explain various types of lighting schemes.	**07**
	(b)	List various protective devices used in the electric circuits and compare working of ELCB with MCB.	**07**

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