Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–I- EXAMINATION – SUMMER 2016

Subject Code:X10901 **Date:02/06/2016**

Subject Name:ELEMENTS OF ELECTRICAL ENGINEERING

Time:02:30 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)	Two metal plates of area 100 cm^2 are separated by a dielectric of 2 mm having a relative permittivity of 5. When a dc voltage of 500 V is applies across the capacitor plates. Find (i) Capacitance (ii) Charge on the capacitor (iii) Electric field strength (iv) Electric flux density	**07**
Q.2	**(a)**	Derive expression for star to delta conversion of resistive network.	**07**
	(b)	Explain charging process of a capacitor.	**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)	If the waveform of a voltage has a form factor of 1.15 and peak factor of 1.5 and if the maximum value of a voltage of 4500 volt, Calculate the average and rms value of the voltage.	**07**
Q.4	**(a)**	Define RMS value. Derive expression for RMS value of a.c. current.	**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: (i) The value of capacitance to produce resonance (ii) The voltage across the capacitance and (iii)The Q-factor of the circuit.	**07**
Q.5	**(a)**	Explain the method of measuring 3-phase power by two wattmeter method.	**07**
	(b)	A coil has resistance of 20 Ω when mean temperature is 20 °C and 30 Ω when mean temperature is 60 °C. Find mean temperature rise when resistance is 25 Ω and surrounding temperature 25 °C.	**07**
Q.6	**(a)**	Define following terms with respect to a.c. waveforms. (i) Frequency (ii) Cycle (iii) Amplitude (iv) Form factor (v) Peak factor (vi) Power factor (vii) Average value	**07**
	(b)	What is temperature co-efficient? Derive equation for the effect of temperature variation on resistance.	**07**
Q.7	**(a)**	What is resonance? Explain resonance condition in series R-L-C circuit.	**07**
	(b)	Explain methods to solve a.c. parallel circuits.	**07**

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