Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER– I EXAMINATION – SUMMER 2015

Subject Code: X10901 **Date:02/06/2015**

Subject Name: Elements of Electrical Engineering

Time:02.30pm-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)**	Explain charging process of a capacitor.	**07**
	(b)	Explain Kirchoff's voltage & current laws with suitable examples.	**07**
Q.2	**(a)**	A parallel plate capacitor has a plate area of 4 cm^2. The plates are separated by three slabs of different dielectric materials of thicknesses 0.3, 0.4 & 0.3 mm with relative permittivities of 3, 2.5 and 2 respectively. Calculate the capacitance of each material and the voltage across them if the supply is 200V.	**07**
	(b)	Explain the similarity & dissimilarity between magnetic circuit & electrical circuit.	**07**
		OR	
	(b)	Derive expression for delta to star conversion of resistive network.	**07**
Q.3	**(a)**	Explain Dynamically induced e.m.f. and Statically induced e.m.f.	**07**
	(b)	Derive the expression for the equivalent capacitance of a group of capacitors when they are connected in (i) series and connected in (ii) parallel.	**07**
		OR	
Q.3	**(a)**	State and explain laws of electrostatics. Also explain Electric field intensity.	**07**
	(b)	Define the term (i) Reactance (ii) Inductive reactance (iii) Capacitive reactance & discuss how they depend on frequency in a.c. circuit.	**07**
Q.4	**(a)**	Explain the phenomena of A.C. through pure inductor with circuit & vector diagram, also prove that active power consumption is zero.	**07**
	(b)	Explain with suitable waveform and vector diagram, the generation of three phase EMF.	**07**

OR

Q.4	**(a)**	Explain the resonance phenomena in R-L-C series circuit & derive the equation for resonance frequency.	**07**
Q.4	**(b)**	Define (1) Frequency (2) Time period (3) Phase difference (4) Average value (5) Active power (6)Power factor (7) Impedance	**07**
Q.5	**(a)**	A 10 ohm resistor and 20 mH inductor are connected in series across 230 V, 50 Hz supply. Find (i) Circuit impedance (ii) Current (iii) Voltage across resistance & voltage across inductor. (iv) Power factor.	**07**
	(b)	Explain the method of measuring three phase power by two watt meters.	**07**

OR

Q.5	**(a)**	Discuss advantages of poly phase system over single phase system.	**07**
	(b)	A 415 V, 3-phase voltage is applied to a balanced star-connection connected to 3-phase load of phase impedance (3 +j 4) ohms each. Calculate (i) Line current (ii) Total power supplied.	**07**

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