Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER –I • EXAMINATION – WINTER 2012

Subject code: 110005 **Date: 24-01-2013**

Subject Name: Elements of Electrical Engineering

Time: 10.30 am – 01.00 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)	What is the temperature co-efficient of resistance? Derive equation of resistance at different temperature. Explain the effect of temperature on resistivity on different type of material.	**07**
	(b)	Derive the equation of Star to Delta and Delta to Star transformation.	**07**
Q.2	(a)	Derive the equation of capacitance of parallel plate capacitor with uniform dielectric medium and with composite dielectric medium.	**07**
	(b)	A parallel plate capacitor has a plate area of 4 cm^2. The plates are separated by three slabs of different dielectric materials of thickness 0.3 mm,0.4 mm and 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 voltage is 100 volt. ($\varepsilon_0=8.854*10^{-12}$)	**07**
Q.3	(a)	Give the similarities and dissimilarities between Electrical circuit and magnetic circuit.	**07**
	(b)	Two coils X and Y are placed close to each other. Coil X has 1000 turns and carries a current 5Amp. The flux produced in this coil is 0.07 mWb. The same 5 Amp. current flows through coil Y having 1300 turns and produces a flux of 1 mWb in it. If 70% of the flux produced by coil X links with coil Y, find (a) Self inductances of both coils. (b) Mutual inductance between two coils. (c) Co-efficient of coupling.	**07**
Q.4	(a)	Derive the equation of decay of current in inductive circuit with small resistance R connected in series with inductor.	**07**
	(b)	Define the following term: (1) RMS value (2) Average value (3) Form factor (4) Peak factor regarding a.c.quantity.	**04**
	(c)	Explain the addition of two vectors by a parallelogram method and by resolution method.	**03**
Q.5	(a)	Draw the phasor diagram in R-L circuit. Draw impedance triangle and power triangle.	**07**
	(b)	Explain series R-L-C circuit with the phasor diagram for $X_L>X_C$;$X_L<X_C$ & $X_L=X_C$.	**07**
Q. 6	(a)	Derive the voltage and current relationship in delta and star connected load.	**07**
	(b)	How can we measure the power with the help of two watt meter method in three phase system with star connected load?	**07**
Q.7			**07**
	(a)	What is the need of earthing? Explain the different method of earthing.	
	(b)	What is the construction of three core cable? Explain each parts and its importance.	**07**

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