Exam Seat No:_____ **Enrollment No:**_____

C.U.SHAH UNIVERSITY

WADHWAN CITY

University (Winter) Examination -2013

Course Name :B.Tech Sem-I **Subject Name: - Fundamental of Electrical Engineering**

Marks :70

Duration :- 2:30 Hours **Date : 20/12/2013**

Instructions:-

(1) Attempt all Questions of both sections in same answer book / Supplementary.
(2) Use of Programmable calculator & any other electronic instrument is prohibited.
(3) Instructions written on main answer Book are strictly to be obeyed.
(4) Draw neat diagrams & figures (If necessary) at right places.
(5) Assume suitable & Perfect data if needed.

SECTION – I

			7
Q.1	(a)	State Ohm's law.	1
	(b)	Define Resistivity	1
	(c)	Define Magnetic flux density.	1
	(d)	Define Electric flux density.	1
	(e)	Define permittivity.	1
	(f)	State & Discuss Coulomb's law.	2
Q.2	(a)	Derive the expression for delta to star conversion of resistive network.	05
	(b)	Define temperature co-efficient of resistance. Prove that $\alpha_t = \alpha_0/(1+\alpha_0 t)$.	05
	(c)	State and Explain the Kirchhoff's current and voltage laws.	04
		OR	
Q.2	(a)	Determine the equivalent resistance between the terminals *A and B* of network shown in figure 1.	05

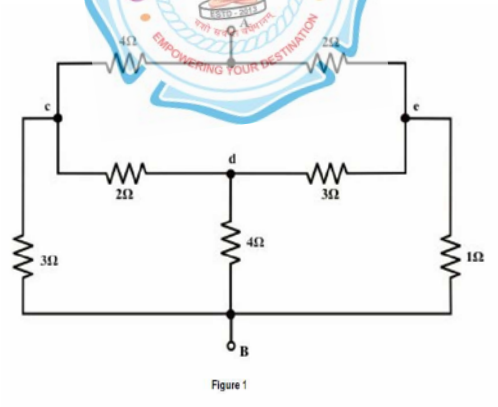

Figure 1

	(b)	A coil has 25 ohm resistance at 40^0 C and 45 ohm at 100^0 C. Find its resistance and resistance temperature coefficient at 0^0 C.	05
	(c)	Explain effect of temperature on resistance of conductors, semiconductors and insulators.	04
Q.3	(a)	Derive equation for charging of capacitor in RC circuit. Also define time constant of circuit.	05
	(b)	An iron ring of 40 cm mean diameter and $7cm^2$ cross section has an air gap of 2mm. it is informally wound with 750 turns of wire and carries a current of 3A. The iron takes 60% of the total mmf. Neglect magnetic leakage. Find the total mmf, magnetic flux, reluctance and flux density.	05
	(c)	Explain Magnetic Hysteresis.	04
		OR	

Q.3 (a) A parallel plate capacitor has a plate area of $4cm^2$. The plates are separated by three slabs of different dielectric materials of thickness 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. 05

(b) Derive the equation for the co-efficient of coupling of two magnetically coupled coils A and B. 05

(c) Compare Electric and Magnetic circuits. 04

SECTION – II

Q.4 (a) Define following terms in connection with A.C wave forms : 07
(i) Frequency (ii) Phase difference (iii) Time Period
(iv) form factor(v) Peak factor (vi) R.M.S.Value (vii) Average Value

Q.5 (a) Prove that current through pure inductor is always lagging by 90^o to its voltage and power consumed is zero. 05

(b) Discuss resonance in R-L-C series circuits. Explain how pf, X_L and R vary with frequency. 05

(C) State the effect of increase in Q on bandwidth. 04

OR

Q.5 (a) Define the term (i) reactance (ii) inductive reactance (iii) capacitive reactance and explain how it depends on frequency in an A. C. circuit? 05

(b) Three impedance Z_1=5-j10F, Z_2=2+j20F and Z_3=4+j2F are connected in parallel. If the total current is 20A, Find the current shared by each. 05

(C) Compare series and parallel resonant circuits. 04

Q.6 (a) Draw and explain the equivalent circuit of single phase transformer. 05

(b) Draw and explain the vector diagrams when transformer is on ON-Load condition. 05

(C) Three inductive coils, each having resistance of 15 ohm and an inductance of 0.03H connected in series, are connected 1. In star and 2. In delta to a 3 phase 400v, 50Hz supply. Calculate in each case line current and total power absorbed. 04

OR

Q.6 (a) Explain the method of measuring 3-Φ power by two wattmeters. 05

(b) Derive the relation between phase and line values of voltages and currents in balanced star connection. Draw complete phasor diagram of voltages and currents. 05

(C) Derive the E.M.F equation of a transformer. 04

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