Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : Fundamental Electrical Engineering

Subject Code : 4TE01FEE1 **Branch :B.Tech(All)**

Semester : 1 Date :4/12/2015 Time :10:30 To 1:30 Marks :70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) A sine wave has a frequency of 50 Hz. Its angular frequency is _____ radian/second.

(a) 100 n (b) 50 jt (c) 25 JT (d) 5 n

b) The period of a wave is

(a) the same as frequency

(b) time required to complete one cycle

(c) expressed in amperes

(d) none of the above

c) The form factor is the ratio of

(a) peak value to r.m.s. value

(b) r.m.s. value to average value

(c) average value to r.m.s. value

(d) none of the above

d) The peak value of a sine wave is 200 V. Its average value is

(a) 127.4 V

(b) 141.4 V

(c) 282.8 V

(d)200V

e) Tesla is a unit of

(a) field strength

(b) inductance

(c) flux density

(d) flux

f) The materials having low retentivity are suitable for making

(a) weak magnets

(b) temporary magnets

(c) permanent magnets

(d) none of the above

g) The power consumed in a circuit element will be least when the phase difference between the current and voltage is

(a) 180°

(b) 90°

(c) 60°

(d) 0°

h) Which of the following does not change in a transformer ?

(a) Current

(b) Voltage

(c) Frequency

(d) All of the above

i) No-load on a transformer is carried out to determine

(a) copper loss

(b) magnetising current

(c) magnetising current and loss

(d) efficiency of the transformer

j) The direction of current in an ac circuit

a) is from positive to negative, b) is always in one direction, c) varies from instant to instant, d) cannot be determent

k) The unit of absolute permittivity of a medium

a) Joules/ coulomb, b) newton –meter, c) farad/ meter, d) farad/ coulomb

l) Capacitive reactance is more when

(a) capacitance is less and frequency of supply is less

(b) capacitance is less and frequency of supply is more

(c) capacitance is more and frequency of supply is less

(d) capacitance is more and frequency of supply is more

m) Capacitors for power factor correction are rated in

(a) kW

(b) kVA

(c) kV

(d) kVAR

n) The efficiency of a transformer will be maximum when

(a) copper losses = hysteresis losses

(b) hysteresis losses = eddy current losses

(c) eddy current losses = copper losses

(d) copper losses = iron losses

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	a)	Define temperature coefficient of resistance prove $\alpha_{t1}= (1/ (1/\alpha_0)+t_1)$ where α_0 is temperature coefficient of resistance at 0^o C.	**(05)**
	b)	What is the fundamental difference between e.m.f and potential difference?	**(05)**
	c)	State and explain the faraday's law of electromagnetic induction.	**(04)**
Q-3		**Attempt all questions**	**(14)**
	a)	Define the statically and dynamically induced E.M.F. Explain the self and mutual inductance and derive the coefficient of couplings for it.	**(07)**
	b)	Discuss the Energy stored in magnetic field.	**(04)**
	c)	Describe the various types of magnetic materials.	**(03)**
Q-4		**Attempt all questions**	**(14)**
	a)	Define the following: 1) Frequency 2) Phase 3) Form factor 4) Amplitude 5) Cycle 6) Time period 7) Alternation	**(07)**
	b)	Derive an expression for the alternating sinusoidal e.m.f.	**(04)**
	c)	What is the meaning of lagging and leading?	**(03)**

Q-5		**Attempt all questions**	**(14)**
	a)	Distinguish between instantaneous power and actual power.	**(04)**
	b)	An inductive coil takes 10A and dissipates 1000W when connected to a 250V, 25 Hz supply. Calculate impedance, resistance, reactance, inductance, power factor and angle of lag.	**(04)**
	c)	Draw a series R-L-C circuit and derive expression for its impedance and power factor angle. Draw a phasor diagram for the circuit.	**(06)**
Q-6		**Attempt all questions**	**(14)**
	a)	What are the advantages of poly phase system over single phase system?	**(07)**
	b)	What is a balanced load? Explain the term " phase sequence"	**(07)**
Q-7		**Attempt all questions**	**(14)**
	a)	How the power factor of a 3- phase balanced load can be determined using two wattmeter	**(07)**
	b)	Star connected unbalanced load is not normally used on 3- phase, 3- wire system. Explain why?	**(07)**
Q-8		**Attempt all questions**	**(14)**
	a)	Derive and explain e.m.f equation for single phase transformer.	**(07)**
	b)	A balance load of (16+j12) Ω per phase, connected in star, is fed from a three phase, 230V supply. Find the line current, power factor, total power, reactive VA and total VA.	**(07)**