Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– 1st / 2nd • EXAMINATION – SUMMER • 2014

Subject Code: 110005 Date: 20-06-2014

Subject Name: Elements of Electrical Engineering

Time: 02:30 pm - 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) MCQs 07

(1).electric tester tests metal bodies or conductors for presence of

(a) Potential (b) current (c) power (d) charge

(2).the life of fluorescent lamp is affected by

(a) Low voltage (b) high voltage

(c) frequency of switching on and off (d) all of the above

(3).high pressure mercury vapour lamps are generally used for

(a) Residences (b) street lighting (c) both (a) and (b) (d) none of above

(4).the earth continuity conductor is generally made of

(a) Copper (b) aluminum (c) brass (d) bronge

(5).the length of earthing electrode is about

(a) 0.5 meter (b) 1.0 meter (c) 2.5 meter (d) 5 meter

(6).the purpose of earthing electric appliances is

(a) safety against shock (b) to ensure proper working

(c) to ensure that appliance gets full voltage (d) all the above

(7).a fuse is inserted in

(a) Phase wire (b) neutral wire

(c) both phase and neutral wire (d) earth continuity conductor

(B) 07

(1).three resistance of 15 ohms each are connected in delta. The value of equivalent star Resistance will be

(a) 15 ohms (b) 5 ohms (c) 5/3 ohms (4) 45 ohms

(2).the rotation between b & h is

(a) $B=\mu H$ (b) $H=\mu B$ (c) $B=\mu^2 H$ (d) $H=\mu^2 B$

(3).the direction of force for current carrying conductor lying in magnatic field is given by

(a).flemings right hand rule (b).flemings left hand rule

(c).cork screw rule (d).none of above

(4).a series RLC circuit has a resonance frequency of 1000 hz if inductance is made four times, the resonance frequency will be

(a)1000 hz (b).500 hz (c).707 hz (d)4000 hz

(5).two impedances 5+j5 and 5-j5 ohms are connected in parallel the combined impedance is

(a) 10+ j0 (b) 2.5- j2.5 (c) 5+ j0 (d) 10

(6).the period of sine wave is 1/50 seconds its frequency is

(a) 25hz (b) 50 hz (c)100 hz (d) 16 1/3 hz

(7).if absolute potential of A point a is 10 volt and that of point B is -5 volt, V_{BA} will be

(a) +15 volt (b) -15 volt (c) 5 volt (d) -5 volt

Q.2 (A). Assuring the resistivity of copper to be $1.7x10^{-6}$ ohm.cm . Find the resitance of copper wire of cross section 1 mm^2 and length 10 meters. Also state the value of the resistance of copper wire if the cross sectional area s made four times keeping the same volume (1x1000 mm^3)

07

(B). In a Wheatstone Bridge circuit ,each branch is of 18 ohms and Galvano Meter resistance is also 18 ohms. Find out current delivered by 18 Volt source of the same bridge.

07

Q3. (A). Explain Quolomb's law. And explain electric potential, equipotential surfaces and electrical field.

07

(B). A magnetic core has length of 0.2m., and has 100 turns of coil wound around it. A current of 1.2 Amp.in the coil product a flux density of 0.18 webers/m^2 in the core. What is the relative permeability of the core materials? 07

Q.4 (A). Explain

(i) Hystoresis loss (ii) Eddy Current Loss

07

(B). Two coils A and B are mutually coupled so that 55% of the flux of Coil A links Coil B. It is found that current of 2A produces a flux of 0.04 mWb in coil A while the same current in B creates in it flux of 0.05 mWb. If Number of turns are 1000 and 13000 respectively Find L_A and L_B of coil A & B respectively(b) Mutual inductance (C) coefficient of coupling.

07

Q.5 (A) Give comparision of electric circuit and magnetic circuit.

07

(B) A 10 ohm resistor is connected to 200 Volt sinusoidal 50 Hz supply. Find the peak, rms and average values of the current and also find power dissipated in resistor.

07

Q.6 (A) State relation between line value and phase value of voltage and current for

(i) balanced star connected load.

(ii) balanced delta connected load.

07

(B) What is the purpose of structure earthing? Discuss pipe and plate type earthings.

07

Q.7 (A) With neat circuit diagram explain working of fluorescent lamp.

07

(B) Explain the process of charging & discharging of lead acid cell. OR Explain fuel cell in brief.

07