

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 (d) 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) $16\frac{1}{3}$ 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). Assuming the resistivity of copper to be 1.7×10^{-6} ohm.cm . Find the resistance 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 is made four times keeping the same volume ($1 \times 1000\text{ mm}^3$) 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 Coulomb'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 produces 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) Hysteresis 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 comparison 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