

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE- SEMESTER 1<sup>st</sup> / 2<sup>nd</sup> EXAMINATION (OLD SYLLABUS) – SUMMER - 2017**

**Subject Code: 110005****Date: 07/06/2017****Subject Name: Elements of Electrical Engineering****Time: 2:30 PM to 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) Explain the similarity and dissimilarity between electric circuit and magnetic circuit. **07**  
(b) Define : (i) RMS value (ii) Average value (iii) Form factor (iv) Peak factor (v) Frequency (vi) Time period (vii) Amplitude **07**
- Q.2** (a) Derive expression for star to delta conversion of resistive network. **07**  
(b) Explain Faraday's laws of electromagnetic induction. What is difference between statically induced e.m.f. & dynamically induced e.m.f.? **07**
- Q.3** (a) Explain the phenomena of A.C. through pure capacitor with circuit and vector diagram. Also prove that active power consumption is zero. **07**  
(b) Two capacitors having 8  $\mu\text{F}$  and 4  $\mu\text{F}$  are connected in series and charges from a constant voltage of 210 V supply. Calculate: (i) Voltage across each capacitor (ii) Charge on each capacitor **07**
- Q.4** (a) Explain resonance condition in series R-L-C circuit. Also derive equation of resonant frequency. **07**  
(b) A circuit consists of a resistance of 4  $\Omega$ , inductance of 0.5 H and a variable capacitance in series across a 100 V, 50 Hz supply. Calculate:  
(1) The value of capacitance to produce resonance **07**  
(2) The voltage across the capacitance and  
(3) The Q-factor of the circuit.
- Q.5** (a) Explain the method of measuring 3-phase power by two wattmeter method. **07**  
(b) Two watt meters are connected to measure 3-phase power for star connected load and read 5.185 kW and 10.37 kW. The line current 10 A. Calculate: (i) Line and phase voltage (ii) Resistance and reactance per phase. **07**
- Q.6** (a) Derive the relation between line voltage and phase voltage, line current and phase current in delta connection. **07**  
(b) Draw and explain the wiring diagram for the staircase wiring. **07**
- Q.7** (a) Classify and explain various types of lighting schemes. **07**  
(b) List various protective devices used in the electric circuits and compare working of ELCB with MCB. **07**

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