

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE- SEMESTER– 1<sup>st</sup> / 2<sup>nd</sup> (OLD) EXAMINATION – SUMMER 2018**

**Subject Code:110005****Date: 28-05-2018****Subject Name: Elements of Electrical Engineering****Time: 02:30 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) State and explain Kirchhoff's laws. **07**  
(b) Derive the equation of Star to Delta and Delta to Star transformation. **07**
- Q.2** (a) Give comparison between electric circuit and magnetic circuit. **07**  
(b) An iron ring of mean length 1 m has air gap of 1 mm wound with 200 turns. The relative permeability is 500. If the current flow through coil is 1 A, calculate flux density. **07**
- Q.3** (a) Derive the equation of capacitance of parallel plate capacitor with uniform dielectric medium and with composite dielectric medium. **07**  
(b) Two capacitors of capacity 2  $\mu\text{F}$  and 4  $\mu\text{F}$  are connected in series. A potential difference of 900 V. Calculate: (i) Voltage across each capacitor (ii) Charge on each capacitor **07**
- Q.4** (a) Define (i) Frequency (ii) Peak Factor (iii) Average value (iv) Form factor (v) Power factor (vi) Instantaneous value (vii) Amplitude **07**  
(b) The following expressions represent the instantaneous values of e.m.f. in three coils connected in series **07**  
 $e_1 = 50 \sin \omega t$   
 $e_2 = 40 \sin(\omega t + 60^\circ)$   
 $e_3 = 60 \sin(\omega t - 30^\circ)$   
Find an expression for the resultant e.m.f.
- Q.5** (a) Explain series R-L-C circuit with the phasor diagram. **07**  
(b) Prove that average power consumption in pure inductor is zero when A.C. voltage is applied. **07**
- Q.6** (a) Derive the relation between line voltage and phase voltage, line current and phase current in star connection. **07**  
(b) What is the construction of three core cable? Explain each parts and its importance **07**
- Q.7** (a) Explain charging of battery from AC supply with schematic diagram **07**  
(b) Explain the working of earth leakage circuit breaker (ELCB) with diagram. **07**

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