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GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER– 1ˢᵗ / 2ⁿᵈ (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 μF and 4 μF 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 $e_1 = 50 \sin \omega t$ $e_2 = 40 \sin(\omega t + 60°)$ $e_3 = 60 \sin(\omega t - 30°)$ Find an expression for the resultant e.m.f.	**07**
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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