GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER-I - EXAMINATION – SUMMER 2017 Subject Code: X10901 Date:01/06/2017 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) Define : (i) RMS value (ii) Average value (iii) Form factor (iv) Peak factor (v)
 O7 Frequency (vi) Time period (vii) Amplitude
 - (b) Explain resonance condition in series R-L-C circuit. Derive the equation of 07 resonant frequency.
- Q.2 (a) Explain effect of temperature on various types of material. Write the unit of 07 resistivity and temperature co efficient.
 - (b) Explain Kelvin's current law and voltage law. Also write its applications. 07
- Q.3 (a) Explain capacitor and capacitance. Write the types of capacitor.
 (b) A coil has a resistance of 18 Ω at 20°C and 22 Ω at 50° C. Find the rise in the temperature when resistance becomes 24 Ω. The room temperature is 18°C.
- Q.4 (a) Explain Faraday's laws of electromagnetic induction. What is dynamically 07 induced e.m.f.?
 - (b) Capacitors having capacitances of 10 μ F, 20 μ f and 40 μ f are connected in series to a 400 V DC source. Find (i) total capacitance of the circuit (ii) total charge in circuit & (iii) total energy stored. 07

Q.5(a) Explain the methods to solve a.c. parallel circuits.07(b) Three currents are represented by07

- (b) Three currents are represented by $i_1 = 10 \sin wt$, $i_2 = 20 \sin (wt - \pi/6) \& i_3 = 30 \sin (wt + \pi/4)$ Find magnitude and phase angle of resultant current.
- Q.6 (a) Derive the relation between line voltage & phase voltage, line current & phase 07 current in star connection.
 - (b) A series R-L-C circuit is connected to 230 V a.c. supply. The current drawn from the circuit at the resonance is 25 A. The voltage drop across the capacitor is 4000 V, at the series resonance, Calculate the resistance & inductance, if capacitance is 5 μF. Also calculate the resonant frequency.
- Q.7 (a) What are the methods to measure 3-phase power in 3-phase circuit? Explain 07 two wattmeter method in detail.
 - (b) Explain charging and discharging of capacitor.

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