Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER 1st / 2nd EXAMINATION (NEW SYLLABUS) – SUMMER - 2017**

**Subject Code: 2110005 Date: 07/06/2017**

**Subject Name: Elements of Electrical Engineering.**

**Time: 2:30 PM to 05:00 PM Total Marks: 70**

**Instructions:**

1. **Question No. 1 is compulsory. Attempt any four out of remaining Six questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | Mark |
|---|---|---|---|
| **Q.1** | | **Objective Question (MCQ)** | |
| | **(a)** | | **07** |
| | **1.** | Define Temperature Coefficient. | |
| | **2.** | Draw Impedance Triangle for R-L series and R-C series circuit. | |
| | **3.** | What is the power factor for pure resistive circuit? | |
| | **4.** | Two capacitors of value 2 Micro Farad are connected in parallel. What is the value of equivalent capacitance? | |
| | **5.** | Write the equation for resonant frequency of R-L-C series circuit. | |
| | **6.** | What is the unit of Magneto motive force? | |
| | **7.** | Define Ampere Hour efficiency of Battery. | |
| | **(b)** | | **07** |
| | **1.** | Draw Circuit diagram for Tube Light wiring. | |
| | **2.** | Two capacitors of value 2 Micro Farad are connected in series.. What is the value of equivalent capacitance? | |
| | **3.** | Define Time period and Frequency. | |
| | **4.** | Two same value of resistors are connected in series across 200 V DC supply. What is the value of voltage across each resistor? | |
| | **5.** | Write the equation of quality factor Q. | |
| | **6.** | What is the unit of Electric field intensity? | |
| | **7.** | List out types of wiring system. | |
| **Q.2** | **(a)** | Explain Ohm's law and limitation of it. | **03** |
| | **(b)** | Explain KCL and KVL. | **04** |
| | **(c)** | Derive the necessary equation for conversion of Star connection to Delta Connection. | **07** |
| **Q.3** | **(a)** | Draw B-H curve for different types of magnetic materials. | **03** |
| | **(b)** | Explain the difference between electric circuit and magnetic circuit. | **04** |
| | **(c)** | Three currents are represented by i1=25coswt, i2 = 20 sin (wt-π/2), i3 = 15 sin (wt-π/6). Find the value of resultant current and phase angle. Write the equation of resultant current. | **07** |
| **Q.4** | **(a)** | List out the materials required for residential wiring. | **03** |
| | **(b)** | Explain the methods to analyze the ac parallel circuit. | **04** |
| | **(c)** | Why fuse is always connected in series with phase wire? Draw well labeled circuit diagram for residential wiring which includes energy meter, main switch, distribution board, switch board and load. | **07** |
| **Q.5** | **(a)** | Explain the specifications of Battery. | **03** |
| | **(b)** | A 3 phase star connected balanced load is supplied with 400 V ac supply. The two wattmeter readings are: 10 kW and -3.5kW. Find the load power factor and line current. | **04** |

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| | **(c)** | Explain the two wattmeter method for measurement of 3-phase power. | **07** |

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| **Q.6** | **(a)** | Derive necessary equation for energy stored in capacitor. | **03** |
| | **(b)** | State and explain Faraday's laws of electromagnetism. | **04** |
| | **(c)** | Explain the charging and discharging of capacitor. | **07** |
| **Q.7** | **(a)** | A single phase R-L series circuit is connected with 200 V, 50 Hz ac supply. The value of resistor and inductive reactance is 10 Ω and 5 Ω respectively. Find Impedance, current and power factor of circuit. | **03** |
| | **(b)** | Explain the R-L-C series resonance phenomena. | **04** |
| | **(c)** | Determine the Average and R.M.S. value of sinusoidal wave form. | **07** |

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