Seat No.:	Enrolment No.

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE- SEMESTER-I & II(NEW)EXAMINATION - SUMMER 2022** 

Subject Code:3110005 Date:12-08-2022

**Subject Name:Basic Electrical Engineering** 

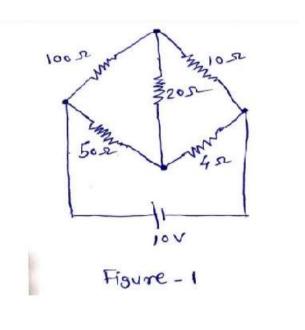
Time:10:30 AM TO 01:00 PM Total Marks:70

## **Instructions:**

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- 4. Simple and non-programmable scientific calculators are allowed.

			Marks
Q.1	(a)	Calculate the Resistance of a 100 m length of wire having a uniform cross sectional area of 0.02 mm <sup>2</sup> and having resistivity of 40 $\mu\Omega$ -cm.	03
	<b>(b)</b>	Explain Kirchoff's law for DC series network in brief.	04
	(c)	Define the following terms for AC (alternating current) signal: (i) Peak Factor (ii) Form Factor (iii) Average Value (iv) RMS Value (v) Time period (vi)Frequency (vii) Cycle	07
Q.2	(a)	State the Superposition theorem with suitable example.	03
	<b>(b)</b>	State the Norton's theorem with suitable example.	04
	(c)	For the Wheatstone bridge diagram shown in Figure 1, obtain the current flowing through the $20\Omega$ resistance using Thevenin's equivalent network.  OR	07
	(c)	Derive an expression for the voltage across the capacitor during charging through the resistor at any instant $Vc = V(1-e^{-t/RC})$ . Assume that RC series circuit is connected across a DC supply of voltage V.	07
Q.3	(a)	Write the comparison between Series resonance and Parallel resonance condition in AC circuit.	03
	<b>(b)</b>	Distinguish between (i) Apparent power (ii) Active power and (iii) Reactive power in ac circuits.	04
	(c)	Prove that the current in purely Capacitive circuit leads its voltage by 90° and average power consumption in pure capacitor is zero.	07
0.2	( )	OR	0.2
Q.3	(a)	List out the merits of two-watt meter method.	03
	<b>(b)</b>	Draw Impedance triangle, Voltage triangle, Power triangle for single phase R-L series circuit.	04
	(c)	Obtain the relationship between line and phase values of current in a three phase, balanced, delta connected system.	07
Q.4	(a)	Explain working principle of single phase Transformer.	03
	<b>(b)</b>	Mention Merits and Demerits of Single Phase Induction Motor.	04
	(c)	Explain construction of Alternator with neat diagram. <b>OR</b>	07
<b>Q.4</b>	(a)	Write applications of Auto Transformer.	03
	<b>(b)</b>	Compare Squirrel cage induction motor and Slip ring Induction Motor.	04
	(c)	Describe construction of a DC machine.	07
Q.5	(a)	Explain the protective device Switch Fuse unit in detail.	03
	<b>(b)</b>	With help of suitable labeled diagram, explain any two types of wires used in the residential and commercial wiring.	04

	<b>(c)</b>	Explain different methods of Power factor Improvement.	07
		OR	
Q.5	(a)	Compare MCB and ELCB.	03
	<b>(b)</b>	Write safety precautions for Electrical Appliances.	04
	(c)	Classify different types Earthing and explain any one in detail.	07



\*\*\*\*\*