

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^2 and having resistivity of $40 \mu\Omega\text{-cm}$.	03
(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) 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 20Ω resistance using Thevenin's equivalent network.	07
OR	
(c) Derive an expression for the voltage across the capacitor during charging through the resistor at any instant $V_c = V(1 - e^{-t/RC})$. 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) 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
OR	
Q.3 (a) List out the merits of two-watt meter method.	03
(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) Mention Merits and Demerits of Single Phase Induction Motor.	04
(c) Explain construction of Alternator with neat diagram.	07
OR	
Q.4 (a) Write applications of Auto Transformer.	03
(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) With help of suitable labeled diagram, explain any two types of wires used in the residential and commercial wiring.	04