GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–I & II(NEW) EXAMINATION – WINTER 2022

Subject Code:3110005   **Date:13-03-2023**

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)**	State and explain Kirchhoff's current Law	**03**
	(b)	Draw the construction of single phase core type transformer	**04**
	(c)	Derive an expression for equivalent resistances of a Delta connected network to transform into a Star connected network.	**07**
Q.2	**(a)**	Prepare a list of parts of a Single phase AC Motor.	**03**
	(b)	When three resistances of 10Ω, 20Ω, and 30Ω are connected in series across 230 V supply. Find (1) equivalent resistance (2) current flowing through each resistance, (3) voltage drop across each and (4) power loss in each resistor	**04**
	(c)	Describe phenomena of series resonance in R-L-C series circuit.	**07**
		OR	
	(c)	Prove that the average power consumption in a pure inductive circuit is zero.	**07**
Q.3	**(a)**	Write statement of Superposition, Thevenin's and Norton's Theorems.	**03**
	(b)	Derive an emf equation of single phase transformer	**04**
	(c)	Define following terms in connection with A.C wave forms : (i) Frequency (ii) Time period (iii) Instantaneous value (iv) Peak factor (v) form factor (vi) R. M. S. Value and (vii) Average Value	**07**
		OR	
Q.3	**(a)**	Write short note on autotransformer	**03**
	(b)	Compare series and parallel RLC circuit resonance	**04**
	(c)	Discuss how the rotating magnetic field is produced in three phase induction motor	**07**
Q.4	**(a)**	State types of sing phase split phase induction motor	**03**
	(b)	Explain Working of capacitor start Single phase induction motor	**04**
	(c)	List the various parts of DC Motor and explain each	**07**
		OR	
Q.4	**(a)**	Define with equation Active, reactive and apparent power in AC circuit	**03**
	(b)	What is power factor? State the methods of power factor improvement	**04**
	(c)	Prove that the sum of readings of two watt meters connected to measure power in three phase circuit gives total power consumed by the circuit	**07**
Q.5	**(a)**	Discuss the difference between MCB and Fuse	**03**
	(b)	Compute the monthly energy charges for an air conditioner having Power consumption of 3 kW and daily uses 10 hours. Energy charges Rs. 5 per unit	**04**
	(c)	Explain Working of Earth Leakage Circuit Breaker (ELCB).	**07**

Q.5 **(a)** Draw the structure of underground cable with name of all sections. **03**

(b) Explain construction of 3-phasae induction motor with diagram **04**

(c) Briefly describe pipe earthing **07**