Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–I&II EXAMINATION – SUMMER 2025

Subject Code:3110005 Date:01-07-2025

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.**

Q.1	**(a)**	State Ohm's law and Kirchhoff's laws.	**03**
	(b)	Define power factor. Write the disadvantages of low power factor.	**04**
	(c)	Derive the equation of star to delta and delta to star transformation.	**07**
Q.2	**(a)**	Write the advantages and disadvantages of polyphase systems.	**03**
	(b)	Define: (i) Form factor (ii) Peak factor (iii) Frequency and (iv) Cycle.	**04**
	(c)	State and explain Thevenin's theorem with suitable example.	**07**
		OR	
	(c)	A 100 V, 100-Watt lamp is connected in series with a 100 V, 60-watt lamp across 200 V supply. Determine current drawn and power consumed by each lamp.	**07**
Q.3	**(a)**	Define: (i) Active power (ii) Reactive power and (iii) apparent power in ac circuits.	**03**
	(b)	Explain the comparison between series resonance and parallel resonance condition in ac circuits.	**04**
	(c)	Prove that current in purely inductive circuit lags its voltage by 90 degree and average power consumption in pure inductive circuit is zero.	**07**
		OR	
Q.3	**(a)**	Define and explain RMS value and average value in ac circuits.	**03**
	(b)	Derive an expression for impedance, current and power factor for an R-L-C series circuit when supplied with ac voltage. Also draw the phasor diagram.	**04**
	(c)	Derive the relationship between line voltage and phase voltage, line current and phase current in a 3-phase balanced star connected circuit	**07**
Q.4	**(a)**	Define transformer. Write the main parts of transformer.	**03**
	(b)	Compare auto transformer with two winding transformers.	**04**
	(c)	Explain various connections of 3-phase transformers with necessary diagrams.	**07**
		OR	
Q.4	**(a)**	Write the advantages and disadvantages of auto transformer.	**03**
	(b)	Write the types of 1-phase induction motors. Explain any one of them.	**04**
	(c)	Explain construction and working of synchronous generator with necessary diagram.	**07**
Q.5	**(a)**	Compare squirrel cage induction motor with slip ring induction motor.	**03**
	(b)	Explain the types of dc motors with diagrams.	**04**
	(c)	Define earthing. Explain plate earthing with diagram.	**07**
		OR	
Q.5	**(a)**	Give a list of safety devices used for home appliances.	**03**
	(b)	Write the comparison of Fuse, MCB and ELCB.	**04**
	(c)	A series R-L-C circuit having a resistance of 8 Ω, inductance of 80 mH and capacitance of 100 μF is connected across a 150 Volt, 50 Hz supply. Calculate (i) the current (ii) the power factor and (iii) the voltage drops in the coil and capacitance.	**07**

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