

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– I & II (NEW) EXAMINATION – WINTER 2019****Subject Code: 3110005****Date: 11/01/2020****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.

		Marks
Q.1	(a) State Ohm's law and Kirchhoff's Laws in context with DC circuits.	03
	(b) A 100V, 60 Watt bulb is to be operated from a 220V supply. What is the resistance to be connected in series with the bulb to glow normally?	04
	(c) Derive an expression for equivalent resistances of a star connected network to transform into a Delta connected network.	07
Q.2	(a) State Thevenin's and Norton's Theorems.	03
	(b) Compare series and parallel resonance in ac circuit.	04
	(c) A single phase R-L-C circuit having resistance of 8Ω , inductance of 80mH and capacitance of $100\mu\text{F}$ is connected across single phase ac 150 V, 50Hz supply. Calculate the current, power factor and voltage drop across inductance and capacitance.	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) Define the following terms in connection with AC waveforms:- 1. Q-Factor 2. Power Factor 3. Form factor.	03
	(b) Draw impedance triangle, Voltage triangle, Power triangle for single phase R-L series circuit.	04
	(c) Derive the relationship between Phase and Line values of voltages and currents in case of 3-phase Star- connection.	07
	OR	
Q.3	(a) Define the terms:- 1. Real power 2. Reactive power 3. Apparent power.	03
	(b) Derive the EMF equation of single phase transformer.	04
	(c) With neat circuit diagram and a phasor diagram prove that two watt meters are sufficient to measure total power in 3-phase system.	07
Q.4	(a) Explain working principle of single phase Transformer.	03
	(b) Give Merits, Demerits and Applications of Induction Motor.	04
	(c) Explain in detail the construction of an Alternator.	07
	OR	
Q.4	(a) Explain working principle of D.C. Motor.	03
	(b) Compare poly phase Induction Motor and single phase Induction Motor.	04

	(c)	Explain Generation of Rotating Magnetic Field in 3-phase Induction Motor with diagrams and equations.	07
Q.5	(a)	Classify different types of cables with reference to voltage and insulation materials.	03
	(b)	Explain the terms:- 1. Residual magnetism 2. Coercive Force.	04
	(c)	Explain the process of charging and discharging of Lead acid cell.	07
		OR	
Q.5	(a)	Compare MCB and ELCB.	03
	(b)	Write safety precautions for electrical Applications.	04
	(c)	Explain different methods of power factor improvement.	07
