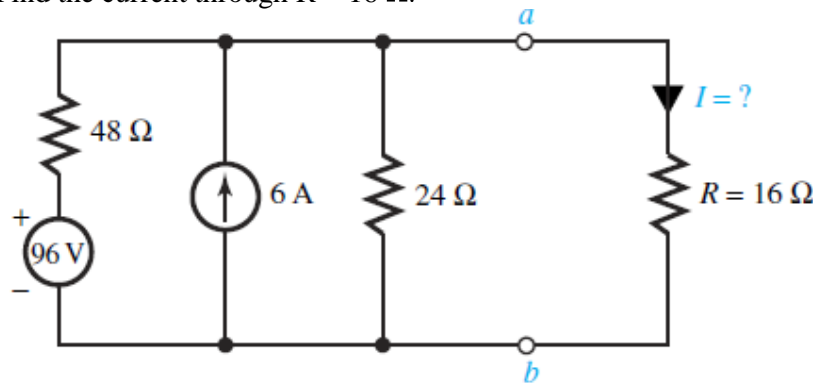# GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–I &II (NEW) EXAMINATION – SUMMER-2019

Subject Code: 3110005   **Date: 20/06/2019**

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 and explain Kirchoff's voltage and current laws.	03
	(b)	Compare the resistive series and parallel circuit.	04
	(c)	Consider the circuit shown in Figure. Reduce the portion of the circuit to the left of terminals a–b to (a) a Thévenin equivalent and (b) a Norton equivalent. Find the current through R = 16 Ω.	07

Q.2	(a)	For series resonant circuit with brief description draw the phasor diagrams for following conditions (i) At resonant (ii) Below resonant (iii) Above resonant.	03
	(b)	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.	04
	(c)	A series RLC circuit with L= 160 mH, C= 100 µF and R = 40 Ω is connected to a sinusoidal voltage V(t) = 40 Sinωt, with ω= 200 rad/sec. Find (i) What is the Impedance of the circuit. (ii) Let the current at any instant in the circuit be I(t) = I_0 Sin(ωt-Φ). Find I_0 (iii) What is the Phase Φ ?	07

OR

	(c)	A balanced star connected load of (4+j3) Ω per phase is connected to a balance 3 phase 400 V supply. Find the line current, power factor, active power and reactive power.	07
Q.3	(a)	For A.C. sinusoidal current prove that $I_{rms} = 0.707\ I_m$.	03
	(b)	Explain voltage step-up and step-down operation in autotransformer with diagram.	04
	(c)	Explain various connections of three phase transformer with diagram.	07

OR

Q.3	(a)	Explain in brief single phase RC parallel circuit with phasor diagram	03
	(b)	Derive the E.M.F. equation of a single phase transformer.	04

	(c)	Explain with diagram construction of core type and shell type transformer.	**07**
Q.4	**(a)**	State significance of the back emf in DC motor.	**03**
	(b)	Classify and compare various DC motor.	**04**
	(c)	Explain construction of synchronous generator with diagram.	**07**

OR

Q.4	**(a)**	Give the classification of Induction motor.	**03**
	(b)	Discuss how the rotating magnetic field is produced in three phase induction motor.	**04**
	(c)	Explain the working of single phase induction motor with diagram.	**07**
Q.5	**(a)**	State function of various parts of HT cable.	**03**
	(b)	Give the comparison of fuse and MCB.	**04**
	(c)	Explain plate earthing with diagram.	**07**

OR

Q.5	**(a)**	What is power factor and why improvement is required in that?	**03**
	(b)	State and explain in brief important electrical characteristics of battery.	**04**
	(c)	Calculate the electricity bill amount for a month of April, if 4 bulbs of 40 W for 5 h, 4 tube lights of 60 W for 5 h, a TV of 100 W for 6 h, a washing machine of 400 W for 3 h, a water pump of 0.5 HP for 15 minutes are used per day. The cost per unit is Rs 3.50. Consider 1 HP = 746 watts	**07**

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