



TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**

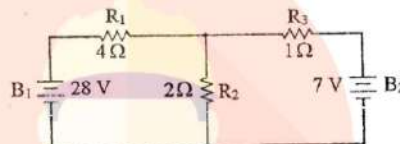
2079 Baishakh

Exam. Level	Back		
	BE	Full Marks	80
Programme	BEL, BEX, BEI, BCT, BAM, BIE, BAG, BAS, BCH	Pass Marks	32
	I / I	Time	3 hrs.

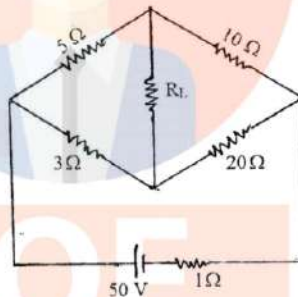
**Subject:** - Basic Electrical Engineering (EE 401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks
- ✓ Assume suitable data if necessary.

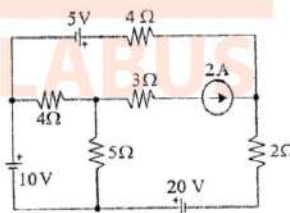
1. a) State and explain Krichof's current and voltage laws. Find the current flowing through 2 ohm resistor using KCL equations. [6]



- b) Find voltage across the given load resistance  $R_L$ . [10]



2. a) Find the current supplied by 10V source using Nodal Analysis in the circuit shown in figure below. [8]



- b) State and verify Reciprocity Theorem with an example. [8]



3. a) Explain the parallel connection of inductors with suitable example and also find the equivalent inductance of the circuit. [8]
- b) A full wave rectified sinusoidal voltage shown in figure below. Find the average and effective value of the voltage. [8]

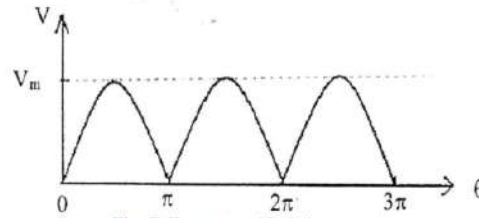
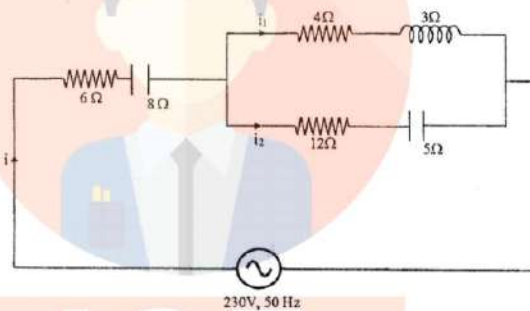


Fig: Full wave rectified sinewave

4. For the circuit shown below. Calculate [16]
- Overall impedance of the circuit
  - Total current taken from supply and overall power factor of the circuit
  - Currents in each parallel branch
  - Active, reactive and apparent power
  - Construct Phasor diagram for given circuit



230V, 50 Hz

5. a) Discuss the advantages of three phase system over single phase system. Mention the causes of low power factor and its measures to improve. [6]
- b) A 380 V, 3- $\Phi$  voltage is applied to a balanced star connected 3- $\Phi$  load of phase impedance  $(5+j9)\Omega$ . If wattmeters are connected taking Y phase reference, calculate wattmeter readings and also reactive power, apparent power and active power consumed. Take RYB phase sequence. [10]

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SYLLABUS



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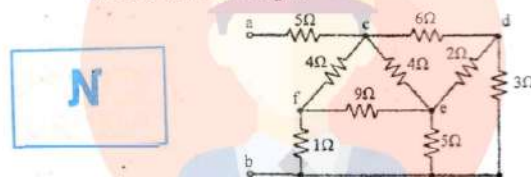
2078 Bhadra

Exam.	Level	Programme	Year / Part	Time
EE	4E	BEL. BEMBEL BCT. BAH. BIL ENG. BAS. ECH	I / I	3 hrs.
		Full Marks	80	
		Pass Marks	32	

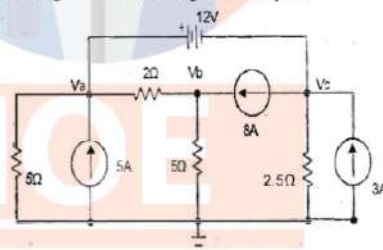
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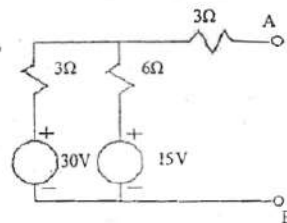
1. a) Define ideal and practical voltage source. Explain the role of internal resistance in practical voltage source with an example. [8]
- b) Using Delta-Star transformation, determine resistance between terminals a and b in the circuit shown in the figure. [8]



2. a) Find the current through  $2\Omega$  resistor using mesh analysis. [8]

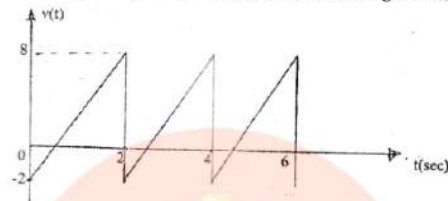


- b) Find the value of resistance to be connected across the terminals A and B to transfer maximum power to it and find the value of this maximum power for the network shown below. [8]

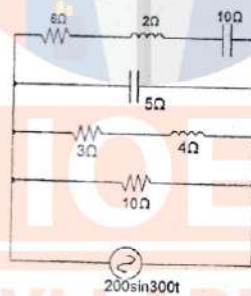




3. a) Calculate the average value, rms value and form factor of the given voltage signal. [8]



- b) A single phase inductive load of 4kW at a power factor of 70% (lagging) is connected across 240V, 50Hz supply. Calculate the kVAR capacity of the capacitor bank and value of capacitance that must be installed in parallel with load to bring the overall power factor to (i) unity, (ii) 85% lagging. [8]
4. In the network shown in figure below, determine: [16]
- Total impedance
  - Total current drawn from source
  - The overall power factor
  - Total Volt Amperes, Active Power and Reactive Power
  - Is the circuit capacitive or inductive?
  - Construct the phasor diagram for given circuit.



5. a) The star-connected load having impedance of  $(12-j16)\Omega$  per phase fed from a 50Hz three-phase, 400V, balanced supply, with the phase sequence as R-Y-B. Find the line current, power factor, active power, reactive power, reactive VA and total volt-amperes (VA). [10]
- b) Describe the measurement of 3-phase power by two wattmeter method. [6]
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