

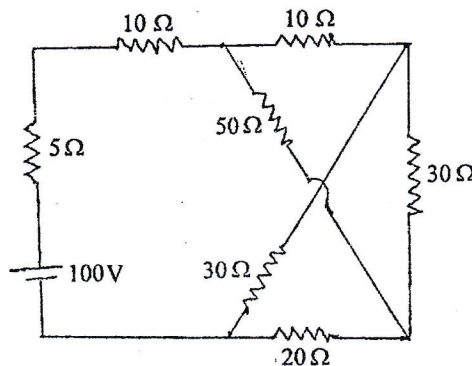
TRIBHUVAN UNIVERSITY
 INSTITUTE OF ENGINEERING
Examination Control Division
 2076 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BEI, BCT, BAM, BIE, BAG, BAS	Pass Marks	32
Year / Part	1 / I	Time	3 hrs.

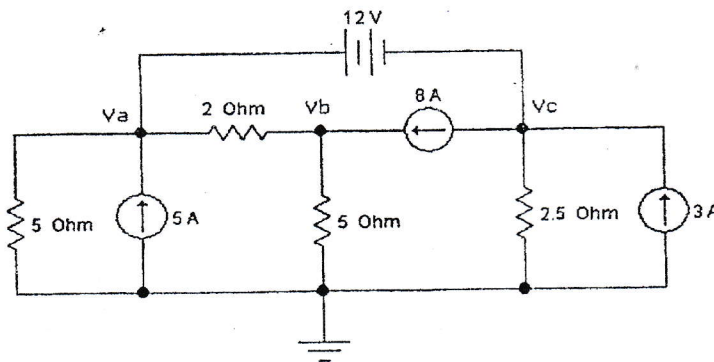
Subject: - Basic Electrical Engineering (EE 401)

- ✓ 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.

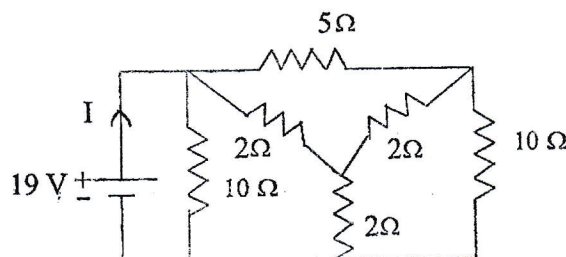
1. a) What are ideal and practical voltage and current source? Explain. [4]
- b) A coil has a resistance of $18\ \Omega$ when its mean temperature is 20°C and of $20\ \Omega$ when its mean temperature is 50°C . Find its mean temperature rise when its resistance is $21\ \Omega$ and the surrounding temperature is 15°C . [6]
- c) State and explain Kirchoff's voltage laws. Determine the current supplied by the battery in the circuit shown in figure below. [6]



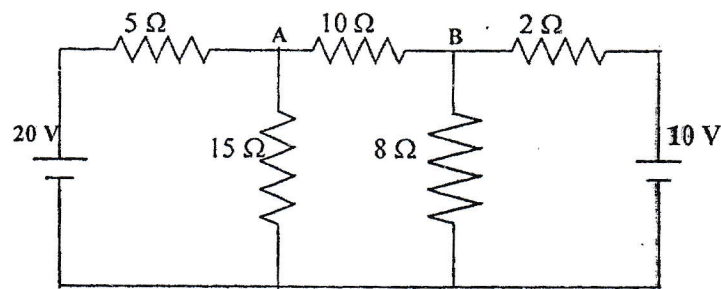
2. a) Use Nodal Analysis Method to determine the V_a , V_b and V_c and Calculate current through $2\ \Omega$. [8]



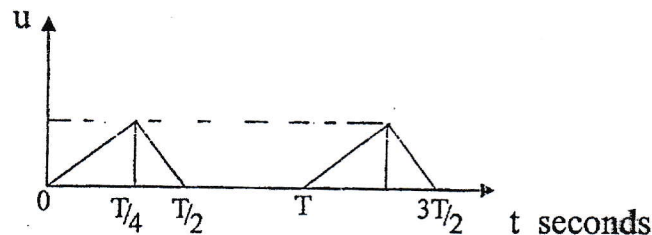
- b) Find the current I as shown in figure using star – delta transformation. [8]



3. a) Calculate the current in the 10Ω resistor in the networks shown in the circuit using Thevenin's Theorem. [8]



- b) Explain what is mean by self inductance and mutual inductance of a coil. [4]
 c) Calculate the average and rms value of the waveform shown below, over one cycle. [4]



4. a) State and explain reciprocity theorem with a suitable example. [4]
 b) A resistance of 20Ω , an inductance of 0.2 H and a capacitance of $100\text{ }\mu\text{F}$ are connected in series across a 220 V , 50 Hz supply. Determine the following (i) impedance (ii) current (iii) voltage across R, L and C. [4]
 c) Two impedances z_1 and z_2 are connected in parallel. The first branch takes a leading current of 16 A and has a resistance of 5Ω , while the second branch takes a lagging current at power factor 0.8 . The total power supplied is 5 kW , the applied voltage being $(100+j200)\text{ V}$. Determine the branch and total currents. [8]
 5. a) What are the disadvantages of supplying a low power factor? A 100 KW load at 0.85 lagging power factor is being supplied by a 230 V , 50 Hz source. Calculate the reactive power drawn from the source. If a capacitor connected parallel to the load improves its power factor to 0.9 , find the capacitance of the capacitor. Also, calculate the current drawn from the source before and after connecting the capacitor. [2+6]
 b) A three phase delta connected system with 400 V line voltage is connected to three unbalanced loads: $(12-j16)\Omega$, $(3+j4)$, and 20Ω , are also connected in delta. Find (i) phase currents (ii) line currents (iii) total active power consumed. [8]
