TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2080 Baishakh

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

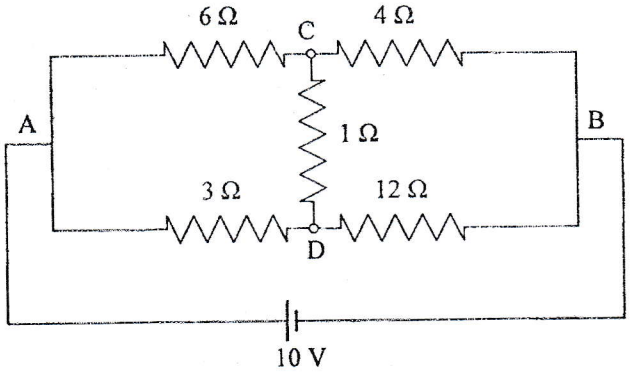
Subject: - Basic Electrical Engineering (*EE 401*)

- ✓ 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.*

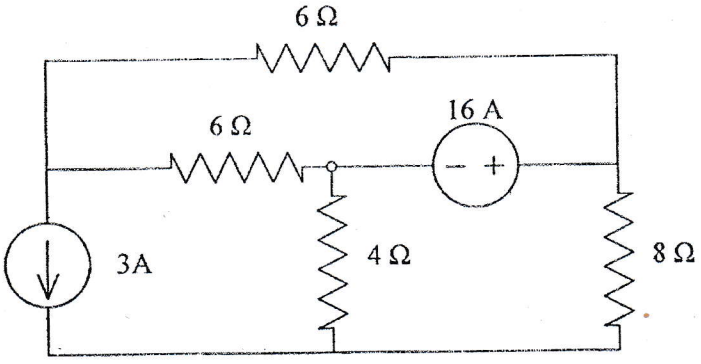
1. a) The resistance of a transformer winding is 460 Ω at room temperature of 25°C. When the transformer is running and the final temperature is reached, the resistance of the winding increases to 514 Ω. Find the average temperature rise of winding, assuming that $\alpha_{20} = 0.004/°C$. [6]

   b) What are ohmic and non ohmic conductors? Discuss voltage current characteristics of a metallic conductor. [4]

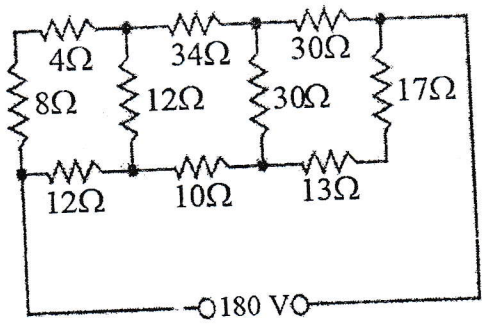
   c) In the given circuit, calculate the current flowing throwing 12 Ω resistor when
      i) C and D are open circuited.
      ii) C and D short circuited. [6]



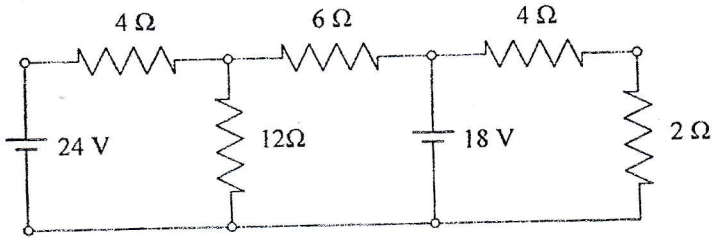
2. a) Prove that VI relation is linear but Power-voltage relation is non-linear. [4]
   b) Calculate the current through 8 Ω resistance using Thevenin's Theorem in the given circuit. [8]



c) Determine the value of source current in the network shown below using star data delta transformation. [4]



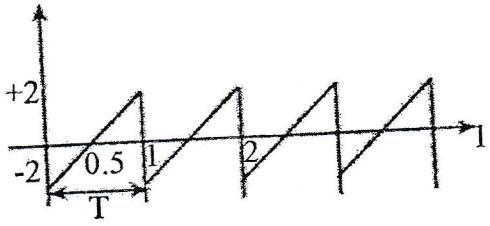
3. a) Determine the current in 6 Ω resister in the circuit shown below using superposition theorem. [8]



b) Find the expression for equivalent self-inductance of two coils when they are placed near to reach to each other in parallel aiding type. [4]

c) Define power factor and explain cause of low power factor. Why in general, it should be kept as high as possible as in power supply systems. [4]

4. a) Determine the average and rms value of voltage for sinusoidal voltage waveforms shown in figure below. Also find peak and form factor. [6]



b) Find the source current, power factor and total power consumed in the given circuit and show the main voltage and branch currents in phasor. [6]

c) Define the terms for an a.c quantity. [4]

i) Lagging (ii) Leading (ii) In phase and (iv) Out of phase be 180°. Draw phasor and wave diagram also.

5. a) An unbalanced star-connected load shown in figure below is supplied by three phase balanced supply of 400V, 50Hz system. Find line currents, current through neutral wire, active power, reactive power and apparent power and overall power. Also draw the phasor diagram. [8]

b) Write the operating principle of a wattmeter. Explain how two wattmeter can measure an active power in a 3 phase circuit. [8]
