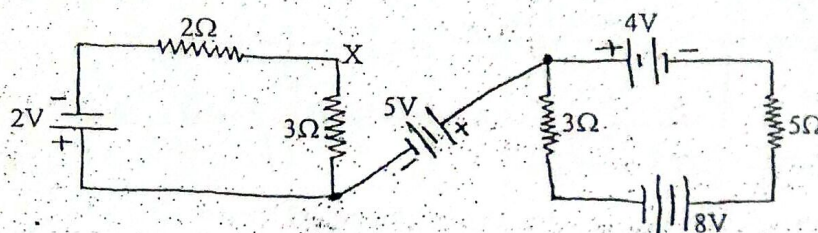


Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCE, BME	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

**Subject: - Basic Electrical Engineering**

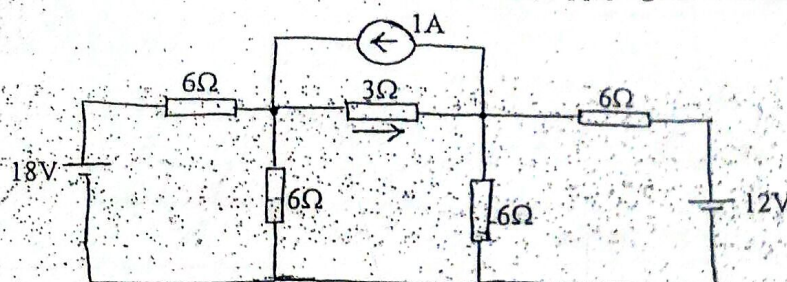
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Five questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) What do you understand by an ideal current source? How can it be made a practical current sources and why should we do that? [6]
- b) What is the difference of potential between X and Y in the network shown in figure below. [5]

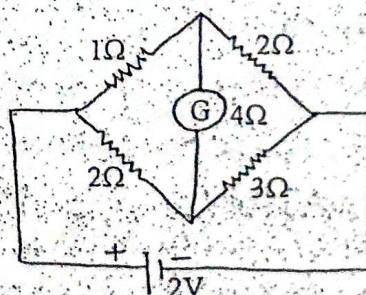


- c) A coil is connected across a constant dc source of 120V. It draws a current of 12 Amp at room temperature of 25°C. After 5 hours of operation, its temperature rises to 65°C and current reduces to 8 Amp. Calculate: [5]
- Current when its temperature has increased to 80°C
  - Temperature coefficient of resistance at 30°C

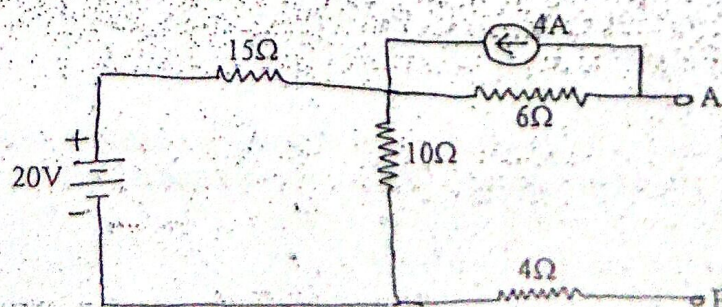
2. a) Find the current I in the circuit of figure given below by applying nodal voltage analysis. [6]



- b) Calculate the current through the galvanometer in the bridge circuit as shown in figure given below using Kirchhoff's laws. [6]

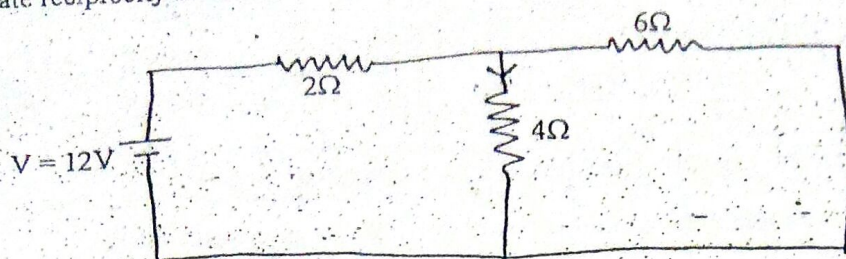


- c) State Thevenin's theorem and find the Thevenin's equivalent circuit for terminal pair AB of the network shown in figure given below. [4]

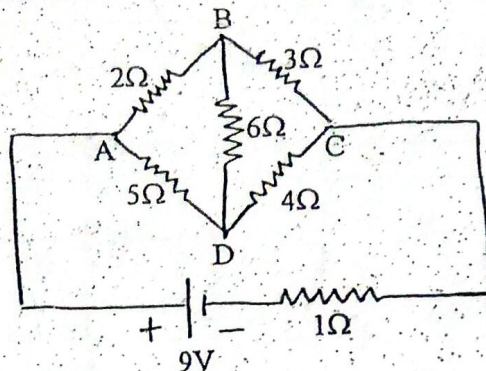




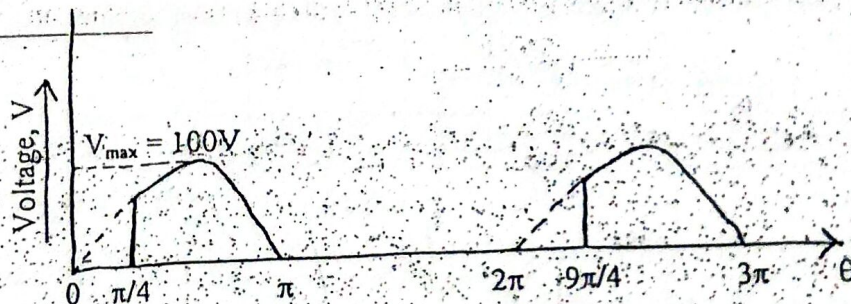
3. a) State reciprocity theorem. Verify the theorem in the network given below. [4]



- b) Calculate the current in the  $6\Omega$  resistor in the network shown below using Norton's theorem. [8]



- c) Why do we express an ac voltage or current by its RMS value? Discuss. [4]
4. a) In a purely inductive circuit when excited by a sinusoidal voltage, show mathematically and graphically, that the current lags the applied voltage by  $90^\circ$  and also show that the average power consumed in the inductor is zero. [6]
- b) Determine the average and r.m.s. values of voltage for sinusoidal voltage waveform as shown in figure below. [6]



- c) Explain with diagrams what do you understand by [4]
- In phase
  - Lagging and
  - Leading quantities applied to sinusoidal ac system.
5. a) An emf,  $e_0 = 141.4 \sin(377t + 30^\circ)$  is impressed on the impedance coil having a resistance of  $4\Omega$  and an inductive reactance of  $1.25\Omega$  measured at  $25\text{Hz}$ . What is the equation of the current? Also find the equation for the resistive drop  $e_R$  and inductive drop  $e_L$ . [6]
- b) Define power factor. Explain the requirement and the method of its correction. [6]
- c) List out the advantages of 3- $\phi$  system over single phase system. [4]
6. a) A balanced star connected load with impedance  $(10+j5)\Omega$  per phase is fed from a balanced 3 phase 400 volt supply. Calculate: [8]
- The phase voltages
  - The line currents
  - The power absorbed and
  - Draw the phasor diagram
- b) Explain 2-wattmeter method for the measurement of power in a balanced three phase load. How are the readings of the two wattmeters affected, when the load is purely resistive? [8]