

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

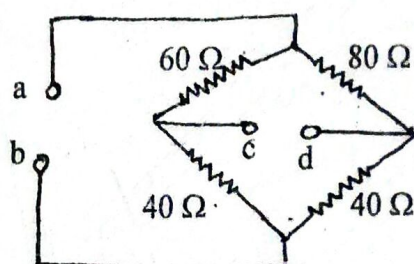
**Subject: - Basic Electrical Engineering (EE451)**

- ✓ 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) Explain resistance on the basis of Ohm's law and discuss different laws of resistance to define resistivity. Also explain how does the resistance of a conductor depend upon temperature. [6]

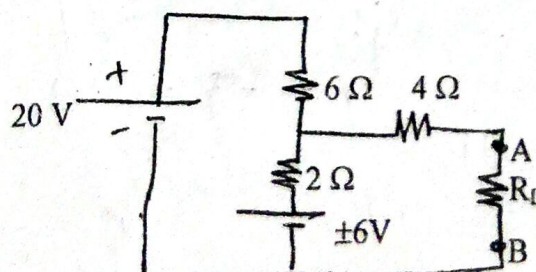
b) In the resistive network shown in the figure below, find the: [4]

- (i) equivalent resistance between terminals 'a' and 'b' when
  - (a) terminals 'c' and 'd' are open
  - (b) terminals 'c' and 'd' are shorted.
- (ii) equivalent resistance between terminals 'c' and 'd' when
  - (a) terminals 'a' and 'b' are open
  - (b) terminal 'a' and 'b' are shorted.

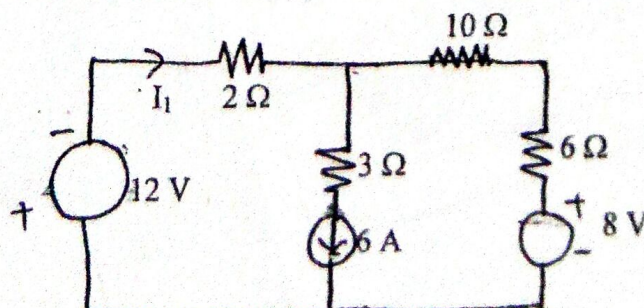


c) What is internal resistance of source? Explain the significance of internal resistance of various sources with suitable examples. [6]

2. a) Find the Venin's equivalent circuit across AB for the following figure below and find the value  $R_L$  to obtain maximum power in  $R_L$ . Also determine the maximum power. [8]



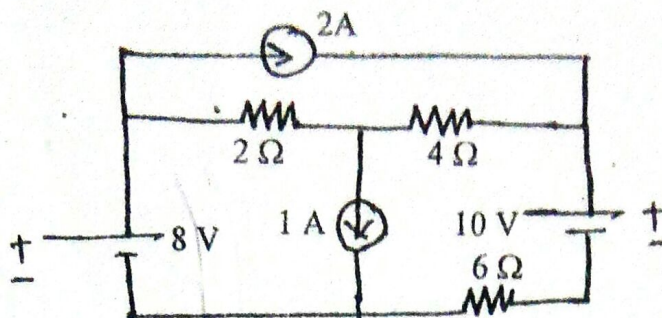
b) Determine the current  $I_1$  in the circuit shown below using superposition theorem. [8]





3. a) Obtain the current flowing through the 2 ohm resistor of the network shown below using mesh analysis.

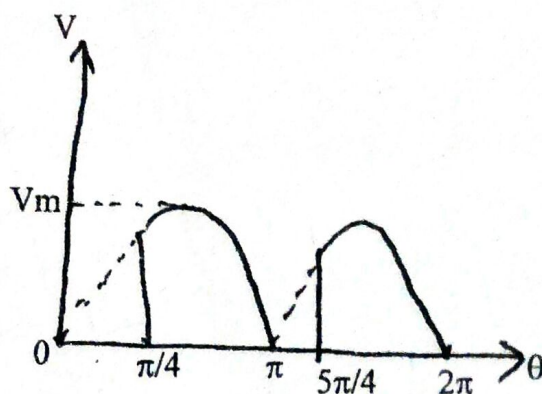
[8]



- b) State and explain the maximum power transfer theorem for dc networks and derive the expression for maximum power delivered by source.
4. a) Calculate the average and rms value of voltage of full rectified sine wave shown in figure below.

[8]

[6]

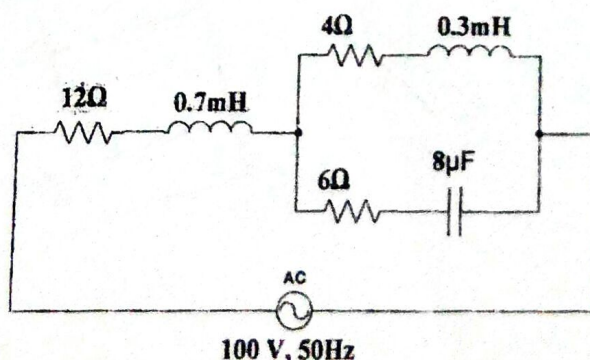


- b) A coil has an inductance of 0.05 H and a resistance of  $10\Omega$ . It is connected to a sinusoidal 200 V, 50 Hz supply. Calculate the impedance, current, power factor and power consumed.
- c) What do you mean by power factor of an ac circuit? What are the causes and effects of low power factor? Why should it be corrected, describe the method of its correction.
5. a) Determine the total impedance, power factor and current in each branch of the circuit below. Also draw the phasor diagram showing all the currents and voltages.

[6]

[4]

[8]



- b) A three-phase load consists of three similar inductive coils each of resistance  $8\Omega$  and inductance 20 mH. The supply voltage is 100 V, 50 Hz. Calculate the line current and total power consumed by the load in star connection. Take phase sequence RYB.

[8]