

Code No: R13212

**R13**

**SET - 1**

**I B. Tech II Semester Supplementary Examinations, April/May - 2017**

**ELECTRICAL CIRCUITS ANALYSIS-I**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of **Part-A** and **Part-B**

2. Answering the questions in **Part-A** is Compulsory

3. Answer any **THREE** Questions from **Part-B**

**PART -A**

1. a) What are linear and non-linear elements? Give an example of each. (4M)
- b) Write the expression for impedance of R-L-C series circuit. When does it have minimum impedance? (3M)
- c) Define Q-factor. Find the Q-factor for an inductor and capacitor. (4M)
- d) State Faraday's laws of electromagnetic induction. (3M)
- e) A connected graph has 9 branches and 4 branch currents which are independent. Find the number of nodes. (4M)
- f) State the limitations for Thevenin's theorem. (4M)

**PART -B**

2. a) Discuss the concept of source transformation technique. (8M)
- b) Find the equivalent resistance between the terminals Y and Z in Figure 1. (8M)

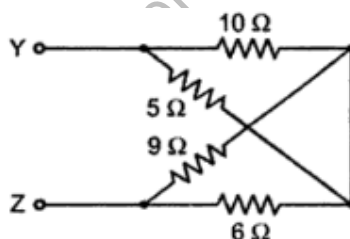


Figure 1

3. a) Define the following: (8M)
  - i) Amplitude of an alternating quantity
  - ii) Instantaneous value of an alternating quantity
  - iii) Frequency
  - iv) Phase
- b) Show that power consumed in a purely inductive circuit is zero when sinusoidal voltage is applied across it. (8M)
4. a) Prove that the locus of the current in an R-L circuit with R variable is a semicircle. Find the radius and the centre of the circle. (8M)
- b) A coil of inductance 0.1H and resistance of  $10\Omega$  is connected in series with a capacitor of  $0.1\mu\text{F}$ . Find frequency of resonance of the circuit. Also find quality factor of the circuit at resonance. (8M)

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5. a) Write the procedure to analyze a parallel magnetic circuit. (8M)  
b) Describe an experiment to illustrate electromagnetic induction. (8M)
6. Explain the following terms with reference to network topology with an example. (16M)
  - a) Twig
  - b) Link
  - c) Oriented graph
  - d) Incident matrix
7. a) State and explain Super position theorem. (8M)  
b) Find  $R_{AB}$  in Figure 2, for maximum power transfer. Also calculate maximum power. (8M)

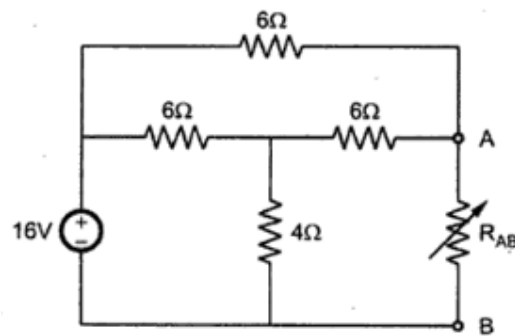


Figure 2