

**B. TECH.
(SEM-III) THEORY EXAMINATION 2019-20
NETWORK ANALYSIS AND SYNTHESIS**

Time: 3 Hours

Total Marks: 70

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief.** **2 x 7 = 14**
- a. Describe the term “Isomorphism” for graph theory.
 - b. What is Hurwitz polynomial
 - c. Write the limitations used for Super Position theorem.
 - d. Explain continuous and discrete time signals.
 - e. Define the Resonance in AC Circuit
 - f. What is Duality in Networks?
 - g. Define the transfer function.

SECTION B

- 2. Attempt any three of the following:** **7 x 3 = 21**
- a. Explain the following:
 - (I) linear and nonlinear circuits
 - (II) active and passive circuits.
 - b. Determine the current pass through 5Ω resistor by using Super position theorem for the circuit as shown in fig. – 1.

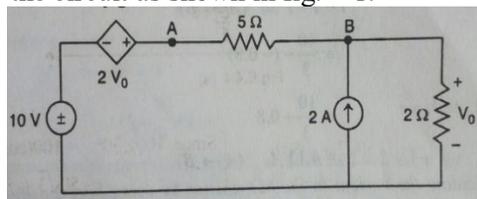


Fig-1

- c. Describe the term incidence matrix and also write its properties.
- d. Explain the term:
 - (i) Butterworth filter
 - (ii) Band stop filter
 - (iii) Band pass filter.
- e. Define the positive real function. Write the properties of positive real function.

SECTION C

- 3. Attempt any one part of the following:** **7 x 1 = 7**
- (a) A series RLC circuit has 10Ω resistance, 60 mH inductance and C Farad capacitance, At frequency of 25 Hz , the p.f. of circuit is 45° lead. at what frequency will the circuit be resonant.
 - (b) Write the characteristics of test signals and also draw its waveform.

- 4. Attempt any one part of the following:** **7 x 1 = 7**
- (a) Calculate the current in the 6Ω resistor of the circuit as shown in fig.-2, by using Thevenin’s theorem.

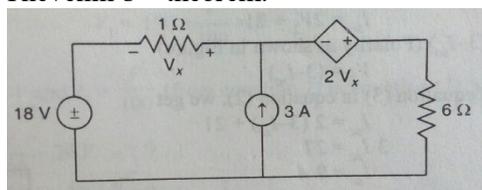


Fig-2

- (b) State and prove the Maximum Power Transfer Theorem.

5. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Define the following terms –
 - (i) Tree and Co-tree
 - (ii) Twig and Link
 - (iii) Tie-set and Cut-set

- (b) For the graph as shown in fig:-3, let 2, 4, 6 as tree branch, find Q_f and B_f and hence show that-

$$Q_f \cdot B_f^T = 0$$

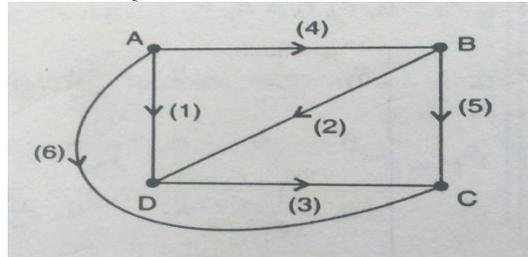
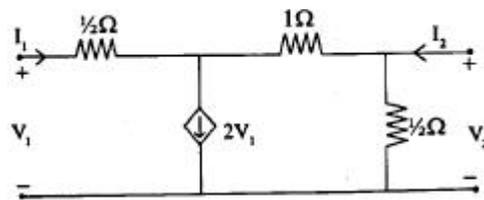


Fig-3

6. Attempt any *one* part of the following:

7 x 1 = 7

- (a) What is meant by symmetry in a two port network? Determine the condition of symmetry in terms of Y-parameter
- (b) Find Y and Z parameters of the network.



7. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Check whether the given function is positive real function or not.

$$F(s) = \frac{s^2 + 6s + 8}{s^2 + 4s + 3}$$

- (b) Realize the function
$$z(s) = \frac{s(s^2 + 4)}{2(s^2 + 1)(s^2 + 9)}$$

- (i) First form of cauer LC Network
- (ii) second form of cauer LC Network