Printed Pages: 02   Sub Code: EEE402

Paper Id: | 120405 | Roll No. | | | | | | | | | | |

B. TECH
(SEM IV) THEORY EXAMINATION 2017-18
NETWORK ANALYSIS AND SYNTHESIS

Time: 3 Hours   Total Marks: 100

Note: 1.   Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt all questions in brief.**   **2 x10 = 20**

   a.   Explain tree of a graph and its properties?
   b.   Explain reduced incidence matrix and how it is drawn.
   c.   What are the applications of Millmans theorem?
   d.   Explain dependent source with the help of an examples.
   e.   Explain the concept of poles and zeros?
   f.   What are the properties of a transfer function?
   g.   Explain Z parameter of a two-port network.
   h.   What do you mean by mage impedance?
   i.   What do you mean by active filter and passive filter?
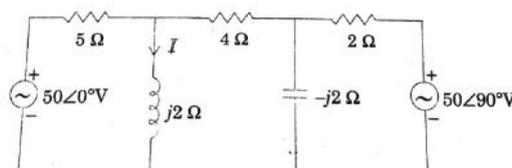   j.   Define positive real function and its properties.

SECTION B

2.   **Attempt any three of the following:**   **10 x 3 = 30**

   a)   Explain the concept of duality and draw the dual network of the following network.
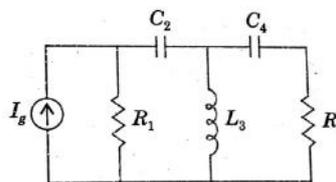
   b)   Explain superposition theorem and find current I using superposition theorem.

   c)   If $H(s) = \dfrac{s(s+1)}{(s+4)(s^2+6s+10)}$, find h(t) using the pole zero diagram of the function.

   d)   Explain H and G parameter of two port network and draw its equivalent network.
   e)   Test for the positive realness of the function given below

$$F(s) = \frac{s^4 + s^3 + 3s + 5}{s^3 + 6s + 8}$$
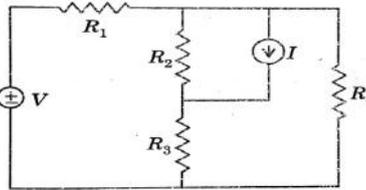
SECTION C

3.   **Attempt any one part of the following:**   10 x 1 = 10

(a)   Find the node voltage for the circuit shown in figure using graph theory.
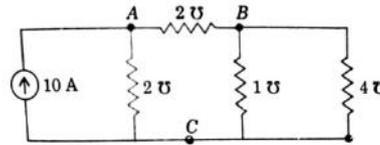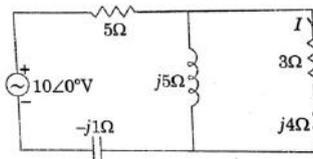

(b)   For the given network find tie set matrix and loop currents.

4.   **Attempt any one part of the following:**   10 x 1 = 10

(a)   Drive the condition for maximum power transfer for an ac circuits and applications of maximum power transfer.

(b)   Explain reciprocity theorem and verify for the network given below.

5.   **Attempt any one part of the following:**   10 x 1 = 10

(a)   Determine the driving point admittance and transfer admittance of the network given with a 1-ohm load resistor connected across port 2.
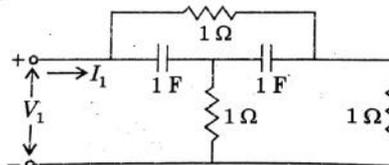
(b)   Explain the concept of complex frequency and discuss the necessary conditions for the driving point function.

6.   **Attempt any one part of the following:**   10 x 1 = 10

(a)   Prove that for a series connection of two port network $[Z] = [Z_A] + [Z_B]$

(b)   Drive the condition of symmetry for a two-port network and find condition of symmetry in terms of Y parameter.

7.   **Attempt any one part of the following:**   10 x 1 = 10

(a)   Synthesize the network using Foster I and Foster II form of the given function

$$Z(s) = \frac{s(s^2+4)}{2(s^2+1)(s^2+9)}$$

(b)   Explain high pass filter and calculate cut off frequencies, characteristic impedance and attenuation constant for the high pass filter.