Hall Ticket No | | | | | | | | | | | Question Paper Code: AEEB09

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations(Regular) - November, 2019

Regulation: IARE – R18

NETWORK ANALYSIS

Time: 3 Hours **(EEE)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) State Superposition theorem and illustrate with an example. What are the limitations of Superposition theorem. **[7M]**

   (b) Determine the current in the load impedance Z_L =3+j4 and verify reciprocity theorem for the network shown in Figure 1? **[7M]**

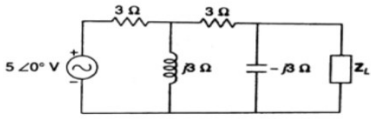

Figure 1

2. (a) State maximum power transfer theorem and determine the condition for maximum power delivered with DC excitation. **[7M]**

   (b) Verify Tellegans theorem for the network shown in Figure 2. Given V_1=10V, V_2=4V,V_4=6V, I_1=2A, I_2=2A,I_3=4A. **[7M]**

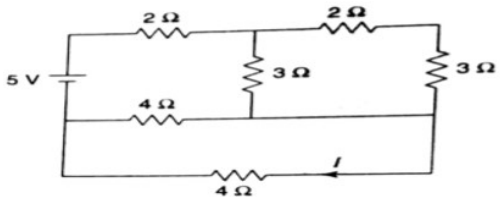

Figure 2

UNIT – II

3. (a) Explain the significance of initial conditions. Write a note on initial conditions in elements. **[7M]**

   (b) In the network shown in Figure 3 the switch is closed at t=0. Obtain the expression for the current i(t) by differential equation approach for t>0. **[7M]**

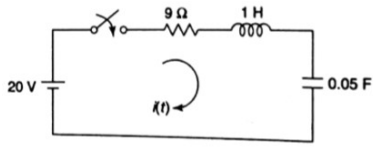

Figure 3

4. (a) Define time constant. Explain time constant of series RL and RC circuit. **[7M]**

   (b) Determine the current i(t) by Laplace transforms approach in the network shown in Figure 4 ,when the switch is closed at t=0. **[7M]**

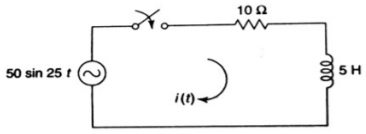

Figure 4

UNIT – III

5. (a) What is the significance of locus diagram? Draw the locus diagram of series RL circuit with variable R and constant L. **[7M]**

   (b) Determine the driving point impedance function and draw the pole zero diagram for the network show in Figure 5. **[7M]**

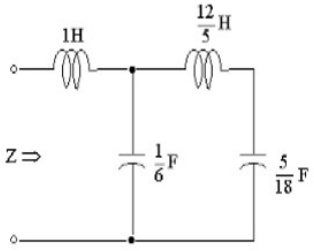

Figure 5

6. (a) What is a driving point function? Explain with one example. Explain the necessary conditions for driving point functions. **[7M]**

   (b) Determine i(t) for the following function by using Pole zero diagram. $I(s) = \frac{10S(S+3)}{(S+2)(S^2+7S+20)}$. **[7M]**

UNIT – IV

7. (a) What do you mean by reciprocity and symmetry of two port networks. Give the condition for reciprocity and symmetry for Z, Y,T and h parameters . **[7M]**

   (b) For the two port network shown in Figure6, find Z parameters and hence find the ABCD parameters. **[7M]**

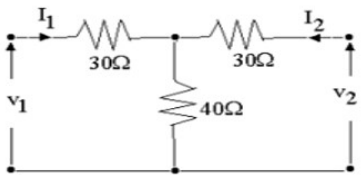

Figure 6

8. (a) Obtain the expressions for Z parameters when 2 two -port networks are connected in series. **[7M]**

   (b) Obtain the Y-parameters for the network shown in Figure 7 below. **[7M]**

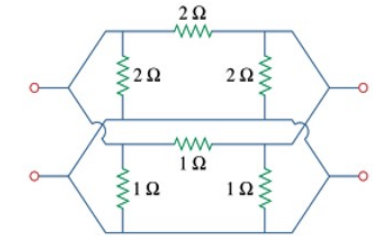

Figure 7

UNIT – V

9. (a) Define a filter and classify filters based on
   i) Frequency variation
   ii) Relation between series and shunt arm impedances. **[7M]**

   (b) Design a constant–k, T and π section low- pass filter having 2.5kHz cut-off frequency and nominal impedance of 700Ω. **[7M]**

10. (a) What are m-derived filters. Explain the design procedure for a m-derived low pass filter. **[7M]**

    (b) Design a m-derived low pass T and π section filter to have termination of 600ohm resistance. The cut-off frequency is 1.8KHz and infinite attenuation occurs at 2KHz. **[7M]**