Hall Ticket No | | | | | | | | | | | Question Paper Code: AEE005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations (Regular) - November, 2018

Regulation: IARE – R16

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) Deduce the relationship between phase and line quantities of voltage and currents in a 3Φ, 3-wire star connected system. **[7M]**

   (b) A three phase balanced delta connected load of (4+j8) Ω is connected across a 400V, 3Φ balanced supply. Determine the phase current and line current. Assume RYB phase sequence. Calculate the power drawn by the load. **[7M]**

2. (a) Sketch the circuit waveforms and the phasor diagram for a Y-connected generator with phase sequence RYB. Repeat for a generator with sequence BYR. Explain why the phase sequence is necessary. **[7M]**

   (b) The power readings of two wattmeters are +15kW and -4kW for a three phase load. If the supply voltage is balanced 440V. Find the true power drawn by the load, the power factor and line current. **[7M]**

UNIT – II

3. (a) Briefly, discuss the transient response in RL circuit with DC excitation. **[7M]**

   (b) In a RC series circuit R = 1Ω and C = 0.5F. A DC voltage V=10v is suddenly applied at t=0. Obtain i (t). Assume no initial charge in the capacitor. **[7M]**

4. (a) A time dependent voltage V(t) is applied to a series connection of RLC network. Find s-domain impedance and current. Assume initial condition of the voltage in inductor to be assisting the input current and that in capacitor opposing the input current. Draw the t-domain and s-domain circuits. **[7M]**

   (b) In a series R-L-C circuit, R = 5Ω, L = 1H and C = 1F. A DC voltage of 20V is applied at t=0. Obtain i(t). **[7M]**

UNIT – III

5. (a) Define network function. Classify the different types of network functions and explain. **[7M]**

   (b) Compute the driving point impedance of the circuit shown in Figure 1 **[7M]**

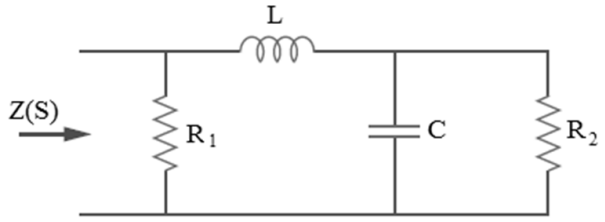


Figure 1

6. (a) State and explain the significance of poles and zeros in network function. **[7M]**

   (b) For the given network function, draw the pole zero plot. And also compute the time domain response of V(s) = 24 (S^2+9) / (S + 2)(S + 8). **[7M]**

UNIT – IV

7. (a) Compute the open circuit parameters of two port network shown in Figure 2. **[7M]**

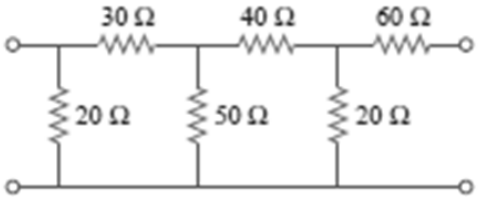


Figure 2

   (b) In the bridge circuit of Figure 3 , I_1 = 10 A and I_2 = -4 A. Find V_1 and V_2 using Y parameters. **[7M]**

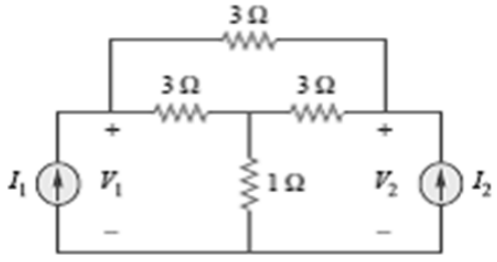


Figure 3

8. (a) Discuss the condition of reciprocity and symmetry in h-parameter representation. **[7M]**

(b) In a two port network, Z_{11}=2Ω, Z_{21}=Z_{12}=5Ω, Z_{22}= 1Ω Find: **[7M]**

(i) Y-parameters

(ii) h-parameters

(iii) ABCD parameters

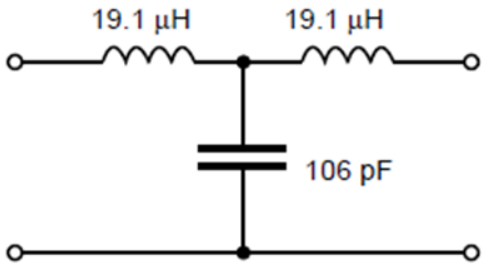
UNIT – V

9. (a) A filter section is required to have a nominal impedance of 600Ω, a cut-off frequency of 5 kHz and a frequency of infinite attenuation at 5.50 kHz. Design (i) An appropriate 'm-derived' T section (ii) An appropriate 'm-derived' π section. **[7M]**

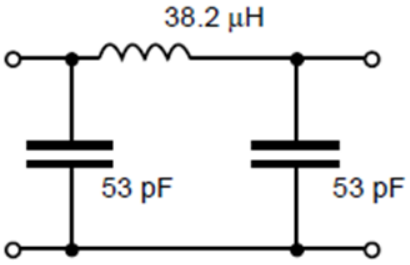
(b) A high-pass T section filter has a cut-off frequency of 500 Hz and a nominal impedance of 600 Ω. Determine the frequency at which the characteristic impedance of the section is (i) Zero (ii) 300 Ω (iii) 590 Ω **[7M]**

10. (a) A filter section is to have a characteristic impedance at zero frequency of 600Ω and a cut-off frequency at 5 MHz. Design (i)A low-pass T section filter (ii) A low-pass π section filter to meet these requirements. **[7M]**

(b) Determine for each of the filter sections shown in Figure 4, (i) The cut-off frequency (ii) The nominal impedance. **[7M]**



(i)



(ii)

Figure 4