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

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Regular) - December, 2017

Regulation: IARE – R16

NETWORK ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 Hours **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) Derive the equation for the voltage and current in star system. **[7M]**

   (b) A symmetrical three phase, three wire 440 V supply is connected to a star connected load. The impedance in each branch are Z_R = 2+j3 Ω, Z_Y = 1-j2 Ω and Z_B = 3+j4 Ω. Find its equivalent delta connected load. The phase sequence is RYB? **[7M]**

2. (a) The readings of the two wattmeters used to measure power in a capacitive load are -3000 W and 8000 W respectively. Calculate **[7M]**
   i. the input power,
   ii. the power factor at the load. Assume RYB sequence.

   (b) A 400 V, three phase supply feeds an unbalanced three-wire, star connected load. The branch impedances of the load are Z_R = 4+j8 Ω ; Z_Y = 3+j4 Ω and Z_B = 15+j20 Ω. Find the line currents and voltage across each phase impedance. Assume RYB phase sequence. **[7M]**

UNIT – II

3. (a) In the circuit shown in Figure 1, determine the complete solution for the current, when switch S is closed at t=0. Applied voltage is v(t) = 100 $cos\ (10^3t + \pi/2)$. Resistance R = 20 Ω and inductance L = 0.1 H. **[7M]**

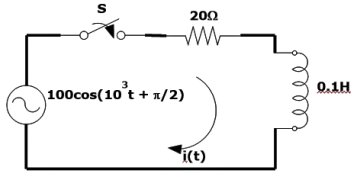

Figure 1

(b) A series RC circuit consists of a resistor of 10 Ω and a capacitor of 0.1 F as shown in Figure 2. A constant voltage of 20 V is applied to the circuit at t = 0. Obtain the current equation. Determine the voltages across the resistor and the capacitor. **[7M]**

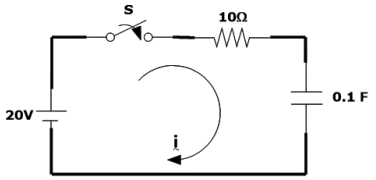

Figure 2

4. (a) A series RLC circuit shown in Figure 3, comprising R = 10 Ω, L = 0.5 H and C = 1μF is excited by a constant voltage source of 100 V. Obtain the expression for the current. Assume that the circuit is relaxed initially. **[7M]**

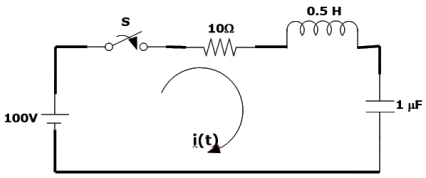

Figure 3

(b) The circuit shown in Figure 4, consists of series RL elements with R = 150 Ω and L = 0.5 H. the switch is closed when $\phi = 30°$. Determine the resultant current when voltage V = 50 cos (100t + ϕ) is applied to the circuit at $\phi = 30°$? **[7M]**

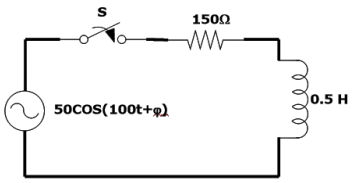

Figure 4

UNIT – III

5. (a) For the circuit shown in Figure 5 plot the locus of the current, mark the range of I for maximum and minimum values of R, and the maximum power consumed in the circuit. Assume $X_L = 25$ Ω and R = 50 Ω. The voltage is 200 V, 50 Hz. **[6M]**

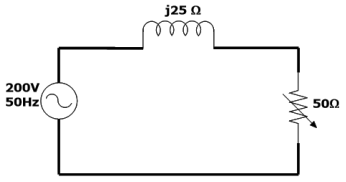

Figure 5

(b) Obtain the transform impedance of the network shown in Figure 6. **[8M]**

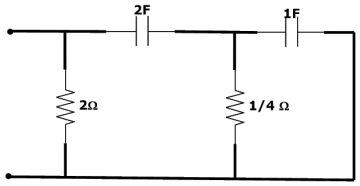

Figure 6

6. (a) List out the necessary conditions for a driving point function. **[7M]**
   (b) Plot the current locus for the circuit with R = 50 Ohms and X_l = 25 Ohms variable V = 200 V, 50 Hz. Find the power consumed. **[7M]**

UNIT – IV

7. (a) Determine Y parameters in terms of Z parameters. **[7M]**
   (b) Find the Z parameters for the network shown in Figure 7. **[7M]**

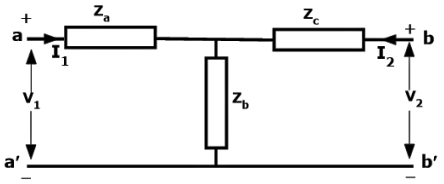

Figure 7

8. (a) Determine the interrelationship between ABCD parameters and Z parameters. **[7M]**
   (b) Determine ABCD parameters for the following network shown in Figure 8. **[7M]**

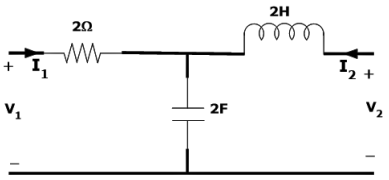

Figure 8

UNIT – V

9. (a) What are the classifications of filter? Discuss them briefly. **[7M]**
   (b) Design a low pass filter (both π and T section) having a cut off frequency of 2 kHz to operate with a terminated load resistance of 500 Ω. **[7M]**

10. (a) Explain briefly about Band Elimination Filter. **[7M]**
    (b) Design a band-elimination filter having a design impedance of 600 Ω and cut-off frequencies f_1 = 2 kHz and f_2 = 6 kHz.

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