Exam.Code:0933
Sub. Code: 6973

2021

B.E. (Electrical and Electronics Engineering)

Third Semester

EE-305: Network Analysis and Synthesis

Time allowed: 3 Hours Max. Marks: 50

***NOTE**: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Missing data (if any) can be appropriately assumed.*

x-x-x

Q1. **Explain briefly.** (5x2=10)

(a) Write the steps to be followed to determine the line currents in unbalanced three phase, three wires star connected load.

(b) Differentiate non planner and planner networks with two suitable examples for each type.

(c) Explain with the help of sketches, the difference between 'one', 'two' port and 'n' port networks.

(d) Enumerate the properties of a Hurwitz polynomial.

(e) What is an inverse Laplace transform? Explain.

Part A

Q2 (a) State the definitions of Thevenin's theorem and maximum power transfer theorem in reference to the circuits having impedances. Also write possible applications of these theorems. (5)

(b) An unbalanced four-wire, star-connected load has a balanced voltage of 440 V, the loads are Z_R = (4 +j 8) ohms; Z_Y = (3 + j4) ohms; Z_B = (15 + j20) ohms. Calculate the (a) each line currents, (b) current flowing in the neutral wire, and (c) the total power of the circuit. Assume RYB phase sequence. (5)

Q3 (a) For the given circuit in figure 1 draw the graph and oriented graph. Selecting a proper tree find out the fundamental tie-set matrix and hence find the voltage V_x. (5)

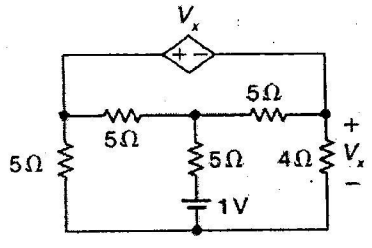

Figure 1

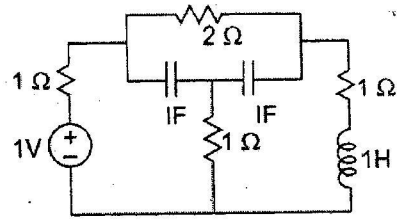

Figure 2

(b) Explain the terms incidence matrix, fundamental tie set and fundamental cut set matrix. Draw the oriented graph and all possible trees for the circuit shown in figure 2. (5)

P.T.O.

Q4. (a) Find the Z and T parameters for the circuit given in figure 3. (5)

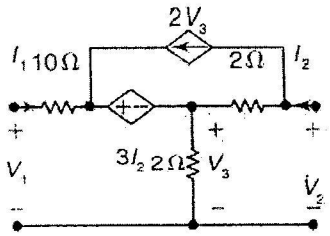

Figure 3

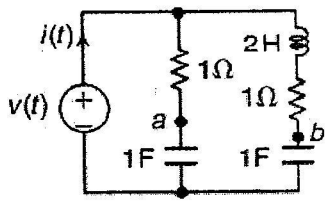

Figure 4

(b) Derive the 'G' parameters of the two port network in terms of Transmission line and Hybrid parameters. (5)

Part B

Q5 (a) Calculate V(s)/I(s) and Vab (s)/ V(s) for circuit shown in figure 4. (5)

(b) Derive the expression for the current supplied by the voltage source in the circuit shown in figure 5. Also find the time taken for the current to reach 50 mA? Assume no initial conditions. (5)

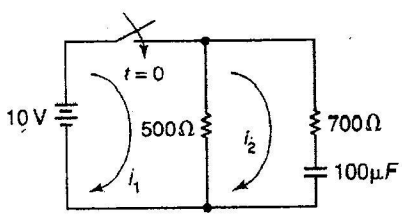

Figure 5

Q6. (a) Find the Foster -I and Cauer-II forms of impedance function given. (5)

$$Z(s)=\frac{s^4+10s^2+9}{s^3+4s}$$

(b) Synthesis the Foster-I and Foster –II for impedance function. (5)

$$Z(s)=\frac{3(s+2)(s+4)}{s(s+3)}$$

Q7. (a) Explain the procedure to check the stability of a given function using the Routh Hurwitz's criterion of stability check. (5)

(b) Necessary Conditions of Driving Point Functions and Transfer Functions. (5)

X-X-X