

2125
B.E. (Electrical and Electronics Engineering)
Third Semester
ES-EE-4304: Network Analysis and Synthesis

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit. Assume any missing data.

x-x-x

I. Attempt the following:-

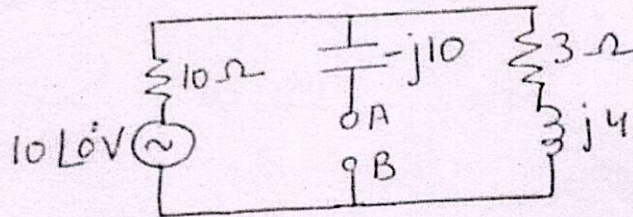
- Derive relation between incidence matrix A and fundamental cutset matrix Q_f .
- What is condition of symmetry in 2-port network? Write it in terms of h-parameters.
- Write T-parameters in terms of open circuit and short circuit impedances.
- Check the following function for driving point function:-

$$\frac{4s^4 + s^2 - 3s + 1}{s^3 + 2s^2 + 2s + 40}$$

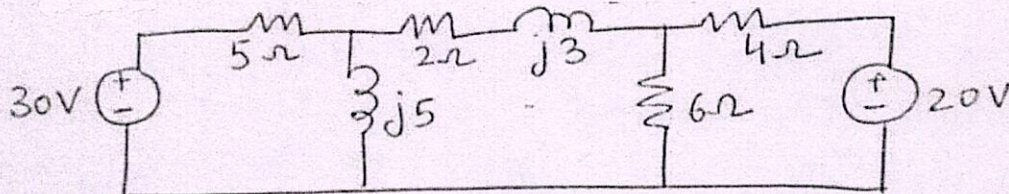
- What are the deficiencies of R-H criterion? (5x2)

UNIT - I

- Obtain Thevenin's equivalent parameters of the circuit at terminals AB. Hence obtain Norton's parameters.

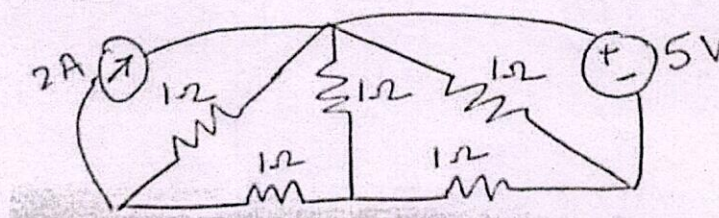


- Using superposition theorem, find current through $(2+j3)\Omega$ impedance.



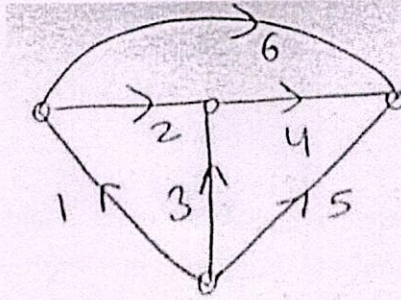
(2x5)

- For the network shown, draw graph. Write tie-set schedule and obtain equilibrium equation on loop basis. Calculate branch voltages and currents.



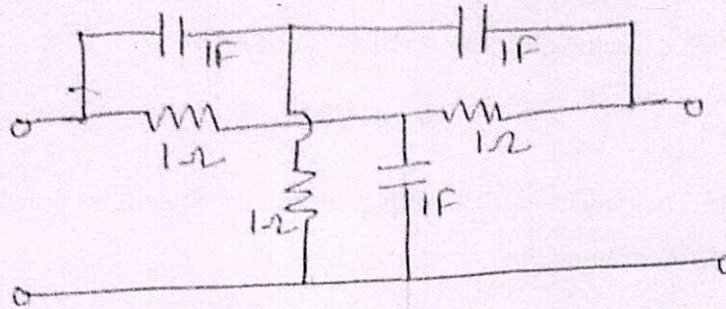
(2)

- b) For the graph shown, consider tree formed by branches (1,2,6). Using this tree, write A , B_f and Q_f .



(2x5)

- IV. a) Derive g-parameters in terms of T and T parameters.
 b) Obtain Y-parameters of the following twin T-network.



(2x5)

UNIT - II

- V. a) Check stability for: $s^4 + 8s^3 + 18s^2 + 16s + 5 = 0$.
 b) Write all necessary conditions for transfer function. (2x5)

- VI. a) Show that the given function is positive real function

$$\frac{(s+2)(s+4)}{(s+1)(s+3)}$$

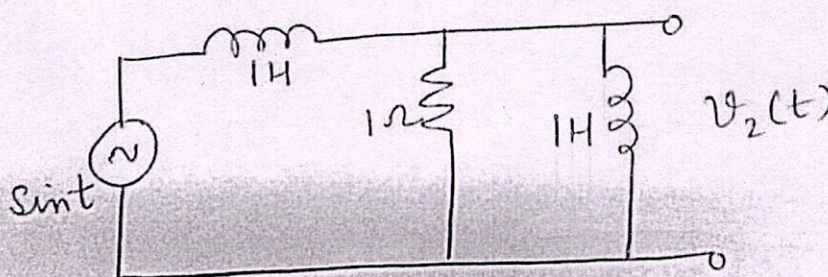
- b) Synthesize Cauer-I and II forms (2,8)

$$\frac{8s^3 + 10s}{s^4 + 6s^2 + 5}$$

- VII. a) Obtain Pole-zero location

$$T(s) = \frac{(2s+4)(s+4)}{s(s+1)(s+3)}$$

- b) Find current $v_2(t)$ using Laplace transformation.



(2,8)