2123
B.E. (Electrical and Electronics Engineering)
Third Semester
ES-EE-301: Network Analysis and Synthesis

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

    a) Show that under the condition of maximum power transfer, the efficiency of a circuit is 50%.

    b) Enlist the properties of an incidence matrix and cut-set matrix.

    c) What are transmission parameters? Where are they most effectively used?

    d) How the stability of a network depends on the position of poles in the s-plane?

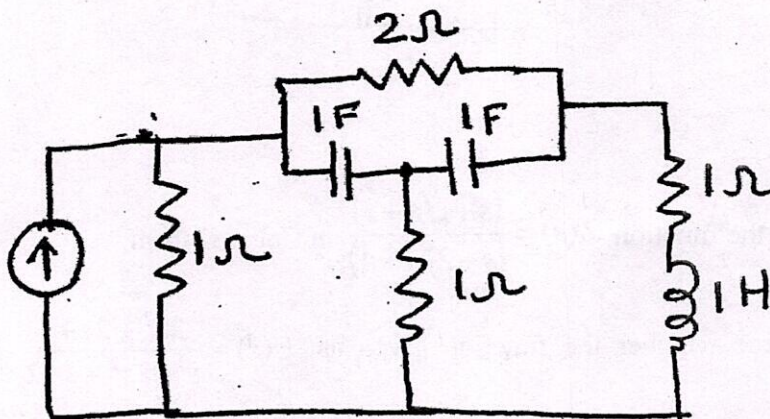   e) State the conditions for a polynomial to be Hurwitz.   (5x2)

UNIT - I

II. Determine the current through $(4-j8)\ \Omega$ branch in the circuit shown using Thevenin's theorem and Norton's theorem.
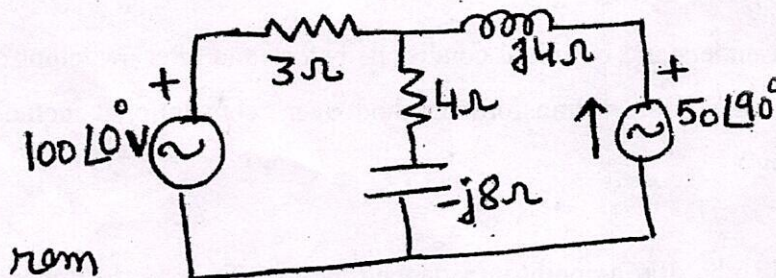
(10)

III. For the circuit shown, draw the oriented graph. Also draw its tree and co-tree. Write the fundamental cut-set matrix.
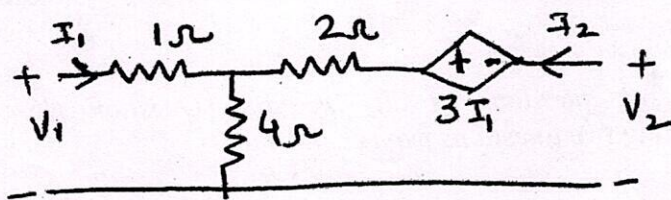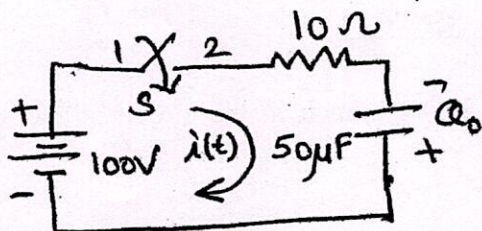

(10)

P.T.O.

IV.   a) Find the transmission parameters for the network shown:-

b) Obtain the reciprocity and symmetry conditions for Z and Y parameters.   (2x5)

UNIT - II

V.   a) In the R-C series circuit, the capacitor has an initial charge of 2.5mC. At t = 0, the switch is closed and a constant voltage source of V = 100V is applied. Use Laplace transform method to find the current i(t) in the circuit.

b) What do you understand by initial conditions before and after switching? Discuss the advantages of the Laplace transform method over conventional method of solving linear equation?   (10)

VI.   What do you mean by driving point impedance function? Express the impedance Z(s) for the network shown. Plot its pole-zero plot and infer about stability of the system.
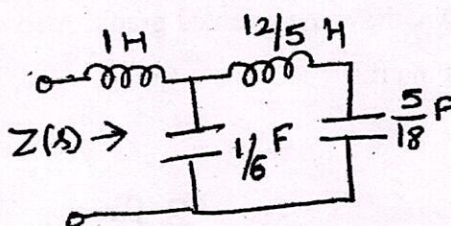
(10)

VII.   a) Realize the function $Z(s) = \dfrac{(s+1)(s+3)}{(s+2)(s+4)}$ in Cauer II form.

b) Determine whether the function given as $F(s) = \dfrac{2s^2 + 2s + 1}{s^3 + 2s^2 + s + 2}$ is a positive real function.   (2x5)

x-x-x