E-EXTC- SEM-III CBSCS (Choice Based)

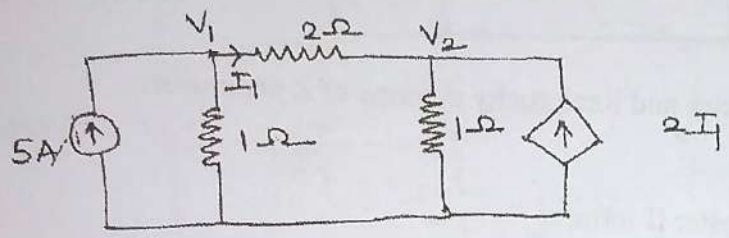
Circuit Theory & Network

Q.P. Code : 24950

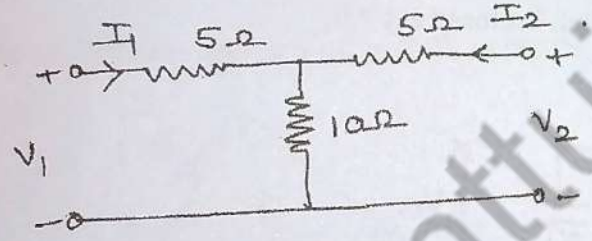
[Time: 3 Hours] [Marks: 80]

N.B: 1. Question No. 1 is compulsory.
2. Attempt any three from remaining questions.

a) Find voltages V_1 and V_2 by nodal Analysis for the circuit given below. 5



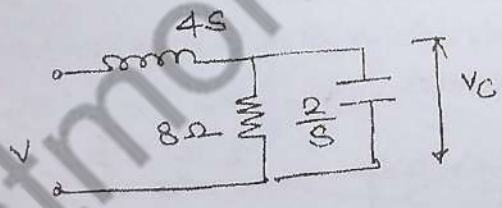
b) Find Z parameter of the following two port network. 5



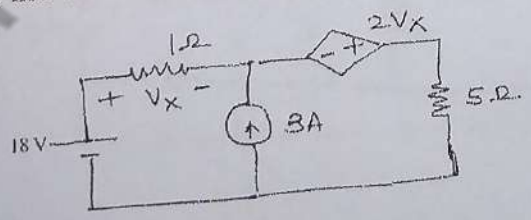
c) Synthesize in cauer I, cauer II, Foster I and Foster II forms. 5

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

d) For the Network shown find v_c/v. Also draw pole-zero plot. 5

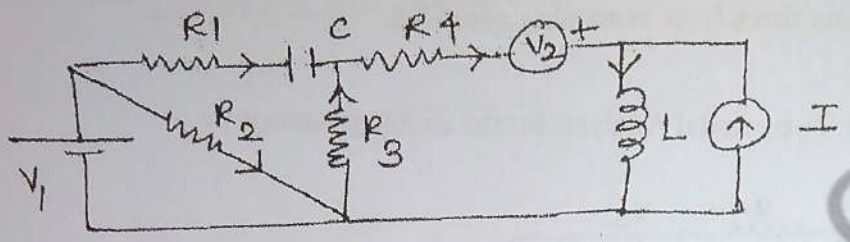


2. a) Find the current through 5Ω Resistor using superposition theorem. 10



Turn Over

b) Draw the oriented graph for the following circuit and obtain its incidence matrix. 5

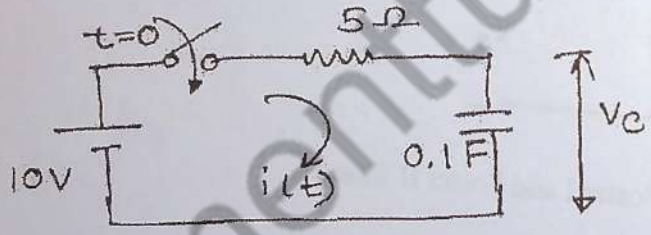


c) Find the condition for symmetry and Reciprocity in terms of Z parameter. 5

3. a) Realise Z(s) in foster I and foster II form. 10

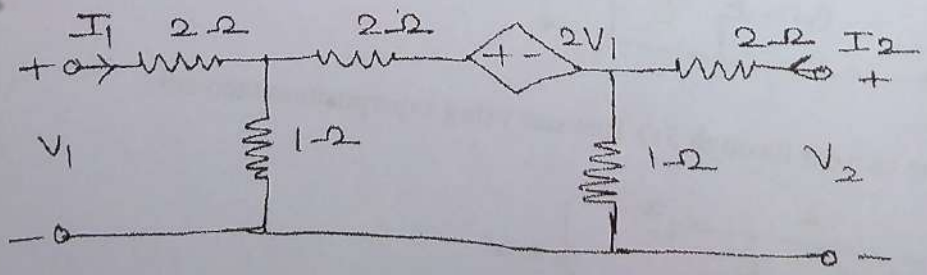
$$Z(s) = \frac{S(S^2+4)}{(S^2+1)(S^2+9)}$$

b) In the following series RC circuit switch is closed at t = 0. 5
Find i(t) and $v_c(t)$ for t > 0.



c) Test whether the given polynomial is Hurwitz 5
i) $S^4 + 7S^3 + 6S^2 + 21S + 8$
ii) $S^5 + S^3 + S$

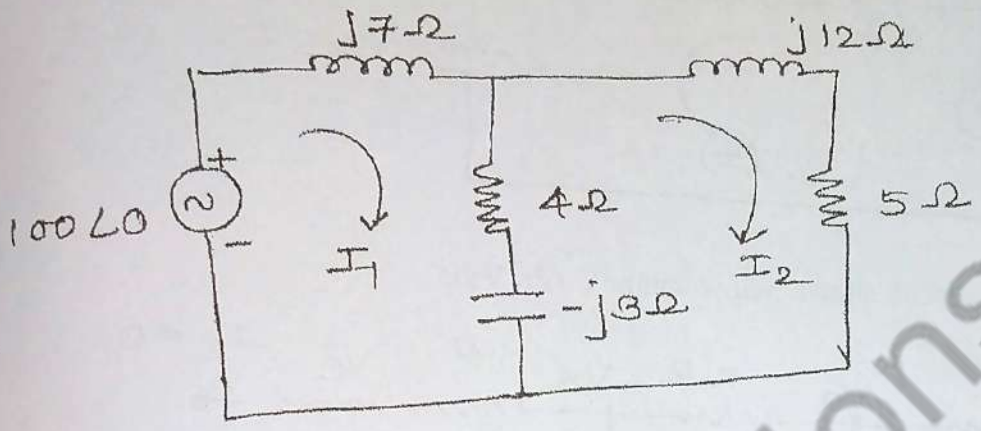
4. a) Find ABCD parameters of the following Network. 10



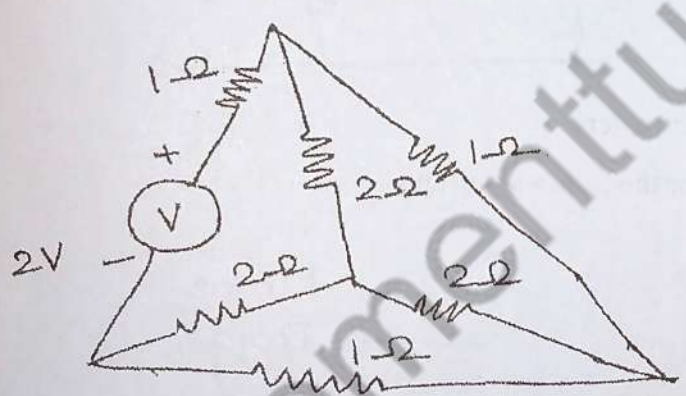
b) Test for positive Real function 5

$$F(S)=\frac{S^2+4}{\left(S^3+3S^2+3S+1\right)}$$

c) Find I_2 using Mesh Analysis 5

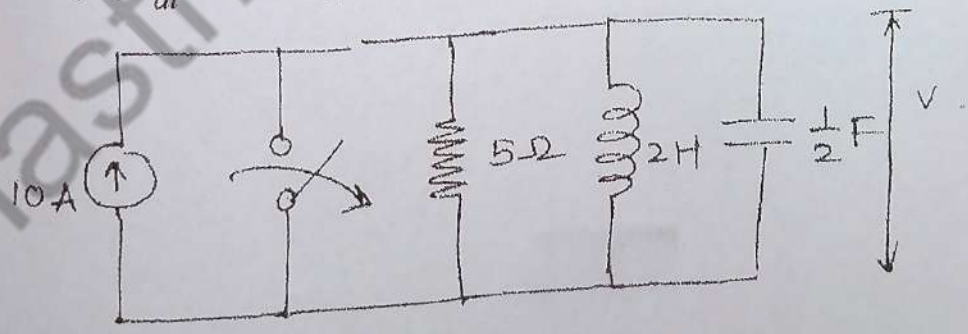


a) Obtain equilibrium equation using KVL in matrix form. Hence find link currents. 10

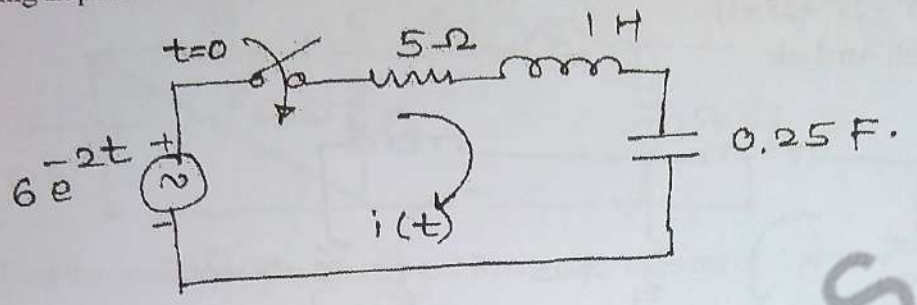


b) In the network given below the switch is closed for a long time and opened at t = 0 5

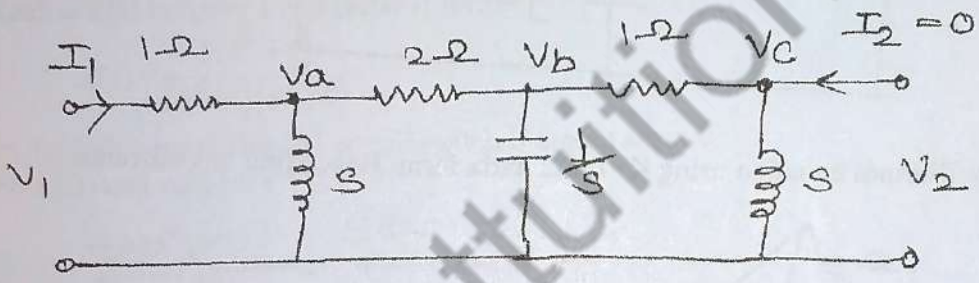
Find $v(0^+)$, $\frac{dv}{dt}(0^+)$ and $\frac{dv^2}{dt^2}(0^+)$



c) The switch is closed at t = 0. Determine current i(t), assuming zero initial condition, using Laplace transform. 5

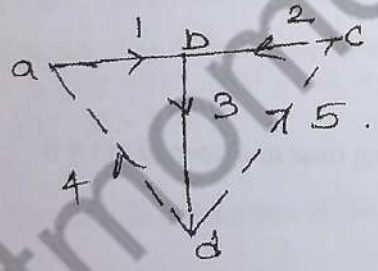


6. a) For the ladder Network shown below obtain V_1/V_2, V_2/I_1. 10



b) Find Z parameters in terms of Y parameters. 5

c) Obtain Tieset and f-cutset matrix for the following graph. 5



---- Links
—— Twigs.
