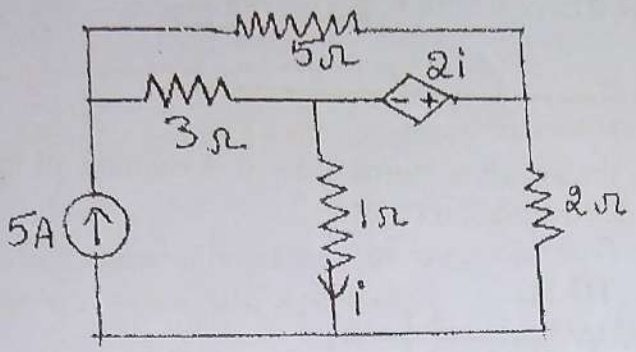
EXTC-Sem III Circuit Theory & Network

QP Code : 24948

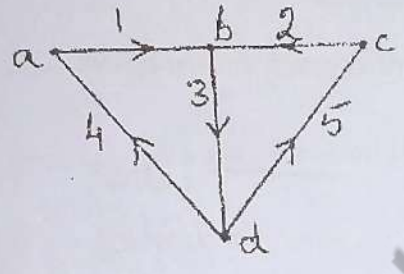
[3 Hours] (CBCS) [Total Marks : -80]

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

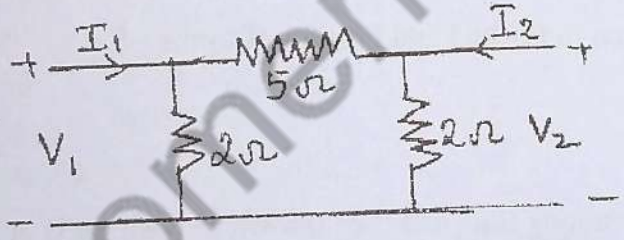
a) Find the voltage drop across 5Ω resistor in the circuit given below. 5



(b) For the graph given below obtain the incidence matrix and find the number of possible trees. 5



(c) Find y parameters for the two-port network shown in figure. 5

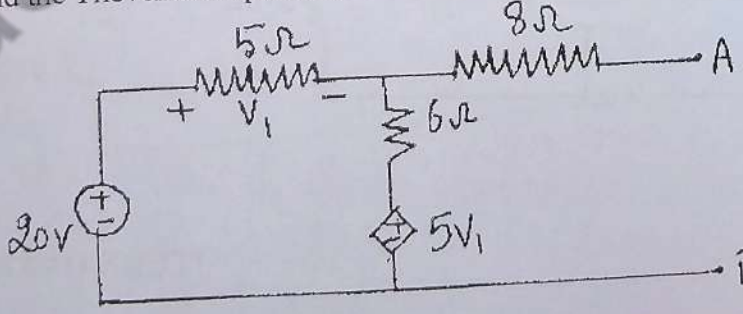


(d) Check whether the following polynomials are Hurwitz 5

(i) $P(s) = S^4 + 7S^3 + 6S^2 + 21S + 8$

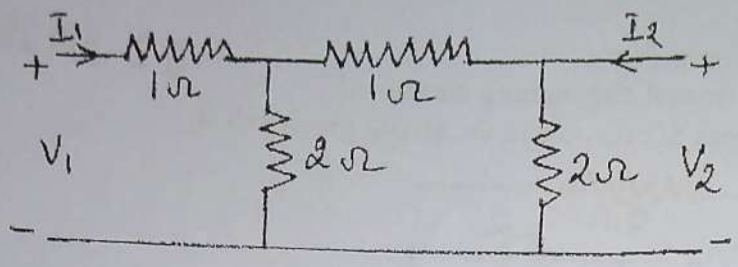
(ii) $P(s) = S^5 + 2S^3 + S$

(a) Find the Thevenin's equivalent across AB and find the power dissipated in a 25Ω load. 10

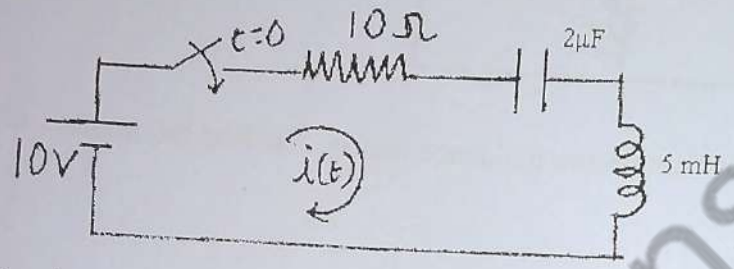


[TURN OVER

(b) Find h parameters for the following Two-port network. 5



(c) In the network shown below the switch is closed at t = 0. Assuming all initial conditions to be zero, find i, di/dt, d^2i/dt^2 for $t = 0^+$. 5

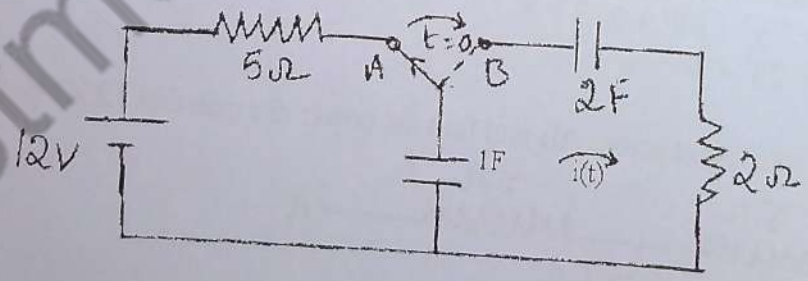


3. (a) Find the tie-set and f-cutset matrix for the oriented graph shown below. 10

(b) Realize the following function in Foster I and Foster – II forms. 10

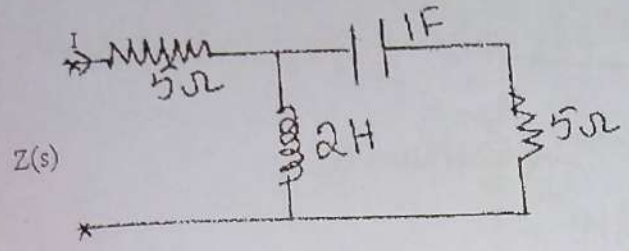
$$Z(s) = \frac{(S+1)(S+4)}{S(S+2)}$$

4. (a) A switch is in position A for a long time and then thrown to position B at t = 0. Find i(t) for > 0. At what value of 't' the current i(t) will become half of current at t =0 10



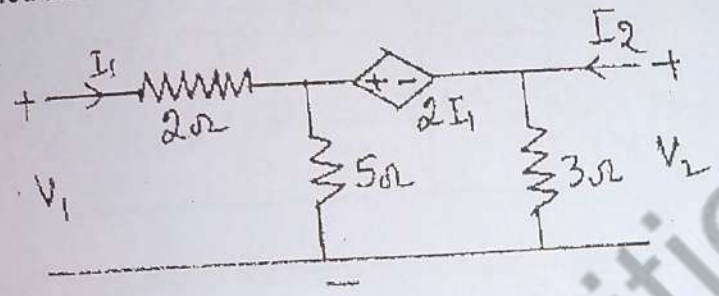
[TURN OVER

For the following network find the driving point impedance function. 5



) Find the condition for symmetry and reciprocity for a two port network using any one parameter. 5

a) Obtain the ABCD parameters of the following network. If two such networks are cascaded find the overall ABCD parameter. 10



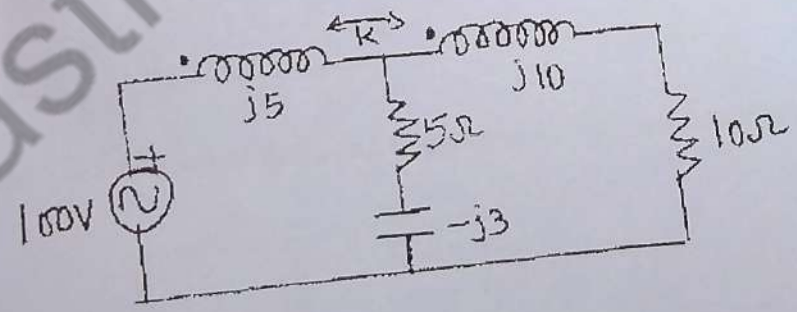
(b) Check whether the following function if positive real or not. 5

$$F(s) = \frac{(S^2 + 6S + 5)}{(S^2 + 9S + 14)}$$

(c) Find the oriented graph if the incidence matrix of the network is as given below. 5

$$A = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 & -1 & 0 & 0 \\ -1 & 1 & 0 & 0 & 0 & 0 & -1 \\ 0 & 0 & 0 & -1 & 0 & 1 & 0 \end{bmatrix}$$

6. (a) Find the mesh currents if the coupling factor k = 0·6 10



[TURN OVER

(b) Find $i_2(t)$ using Laplace transform. 10