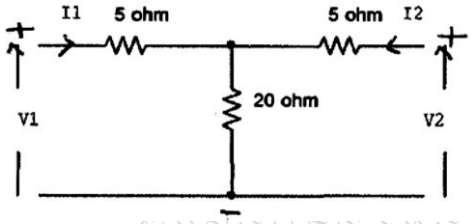
[Time: 3 Hours] **[Marks:80]**

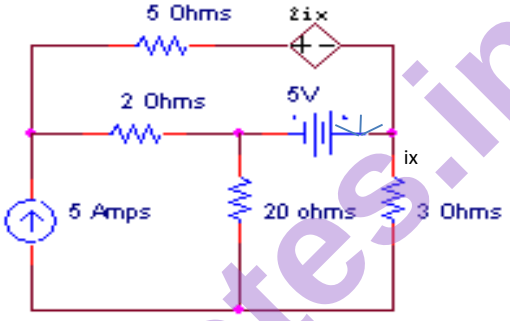
Please check whether you have got the right question paper.

N.B: 1. Question one is compulsory.
2. Answer any three questions from the remaining five.
3. Assume suitable data if required.

1. a) Find y parameters. 05



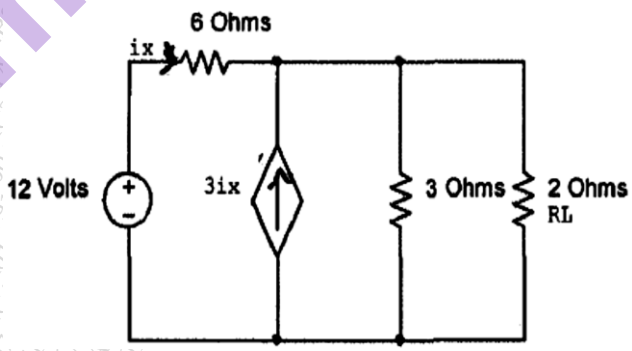
b) Find the current through 5Ω resistor 05



c) What is a Positive Real function? What are the properties of PR function? 05

d) Realize the following function in Cauer-I and Cauer-II forms 05
$Z(s) = S(S+3) / (S+1)$

2. a) Find the current through RL, in the circuit given below using Norton's theorem and also find power dissipated in R_L. 08

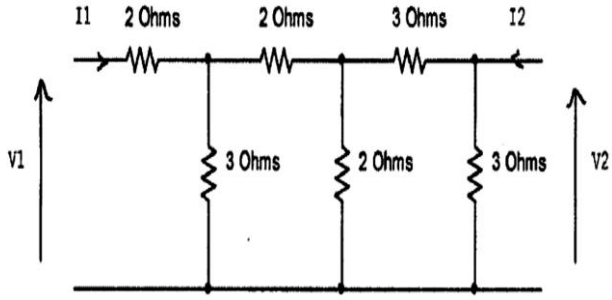


b) Check whether the following functions are Hurwitz 06
i) $P(s)= S^4+6S^3+10S^2+18S+36$
ii) $P(s)=S^6+ 2S^5+5S^4+8S^3+8S^2+8S+ 1$

c) Draw the graph of the network whose incidence matrix is given below. 06

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

3. a) Find the overall ABCD parameters of the following network, by dividing the network into two or more sections. 10



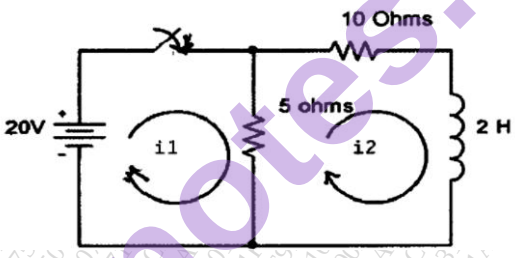
b) State and prove final value theorem. 05

c) Test whether the following function is Positive Real 05
F (S) = $(2S^2 + 2S + 1) / (S^3 + 2S^2 + S + 2)$

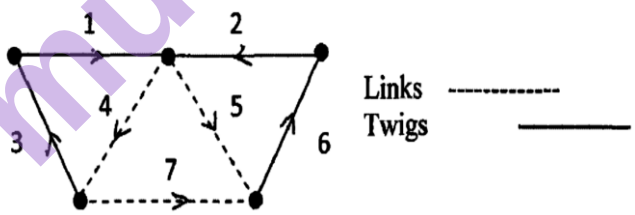
4. a) Synthesize the following function in Foster-I and Foster-II forms 08
Z(S) = 4 (S + 2) (S + 7) / S(S + 4)

b) Find h parameters in terms of z parameters 06

c) In the following network the switch is closed at t = 0, find $i_1(0^+)$, $di_1(0^+)/dt$, $d^2i_1(0^+)/dt^2$, $i_2(0^+)$, $di_2(0^+)/dt$ 06

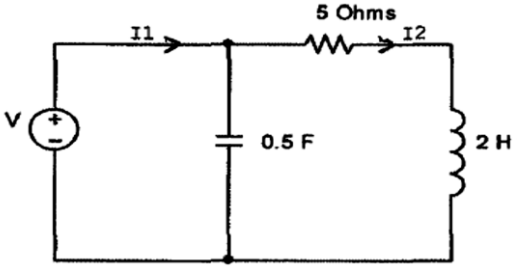


5. a) Obtain the tieset and f-cutset matrix for the graph given below. 10

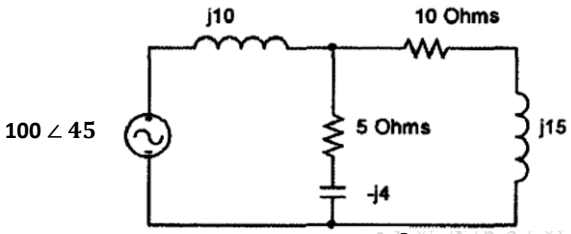


b) Find the condition for symmetry and reciprocity of a 2 port network 06

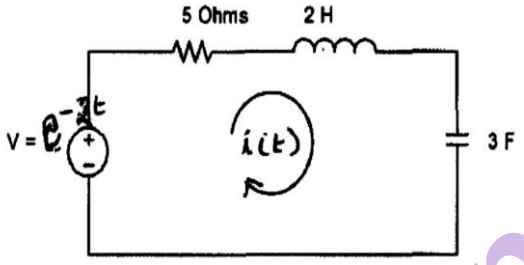
c) Find $1_2/I_1$ for the following network. 04



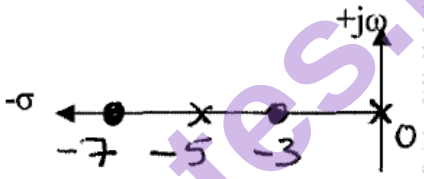
6. a) Find the voltage across 10Ω resistor using mesh analysis 08



b) Find i(t) using Laplace Transform the input voltage is e^{-2t}. 08



c) The pole zero plot of a driving point admittance function is give below. Find the function if Z (-4) = 5 and state whether it is RL, RC or LC function. 04



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