S.E (Etrx) Sem 3 (Rev.)
Electrical Network Analysis & Synthesis 03/01/08

VT Nov 07 6

Con/5468–07. **(REVISED COURSE)** **CD–6714**

(3 Hours) **[Total Marks : 100**

N.B (1) Question No. **1 is compulsory**
(2) Attempt any **four** out of the remaining **six** questions.
(3) Assume **suitable** data **if required.**
(4) **Figures** to the right indicate **full** marks.

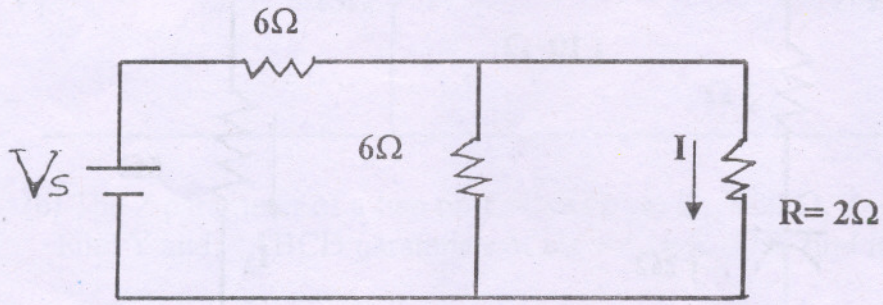
1. Attempt the following questions

(a) Draw the graph from given incidence matrix and calculate total number of possible trees.

$$A = \begin{vmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ -1 & 1 & 0 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 & 0 & -1 \end{vmatrix}$$ 4

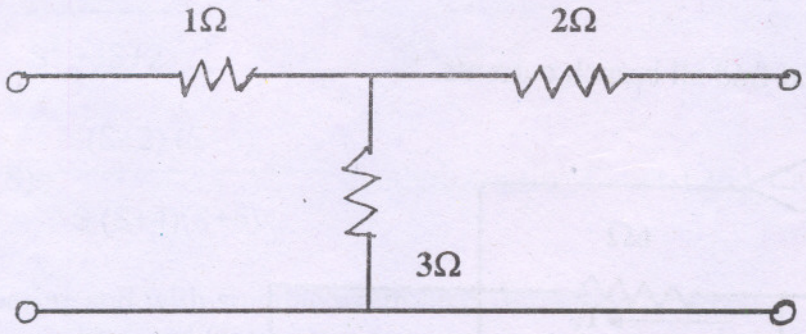
(b) Write a short note on source shifting and source transformation. 4

(c) Current in 2Ω resistor is I = 3A. If R is changed to 3Ω, find new value of I



4

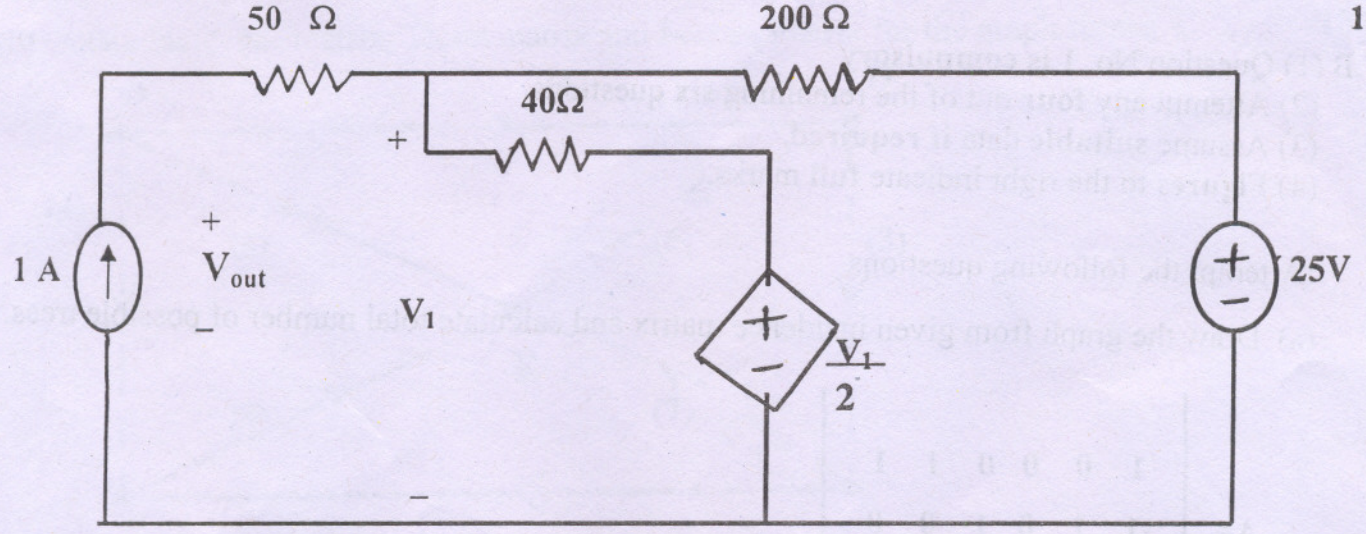
(d) Determine parameter Z_{22} and A for the network shown.



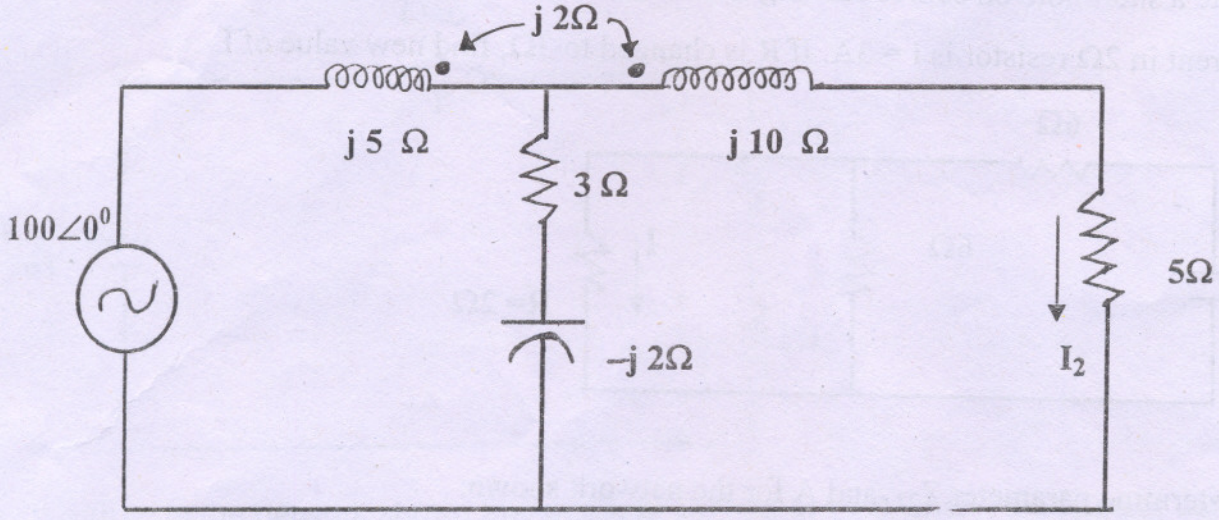
4

(e) Write short note on initial condition and its significance. 4

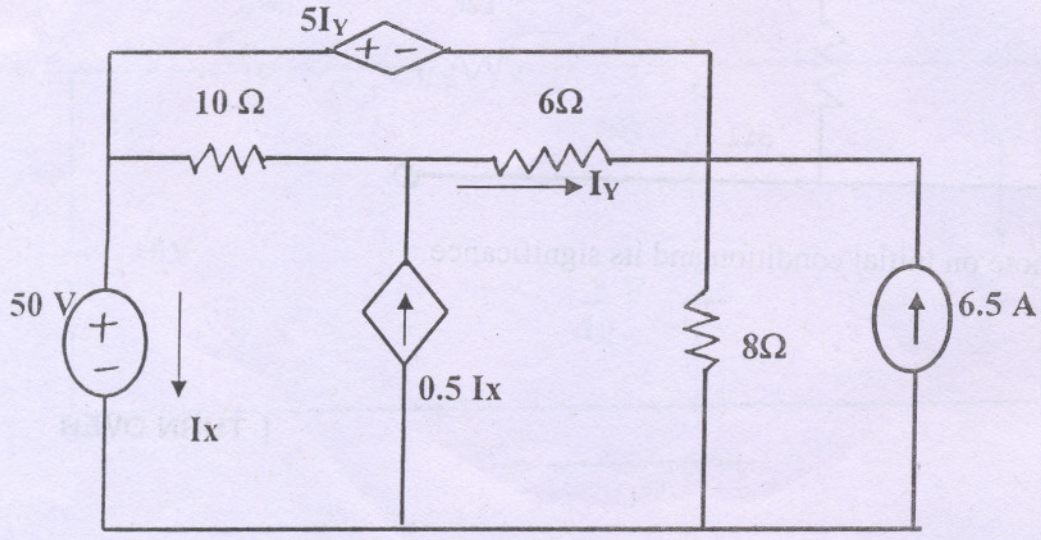
2 (a) Find V_{out} by superposition theorem. 10



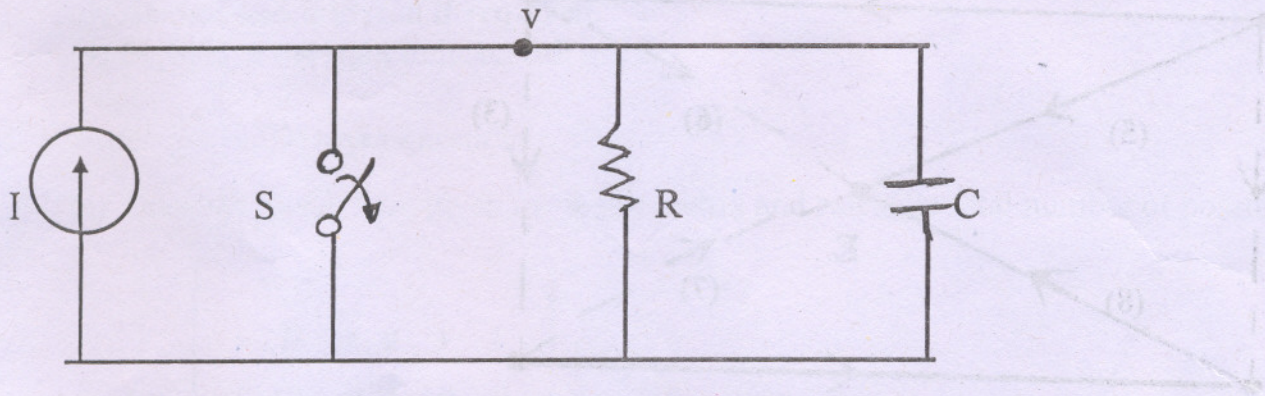
(b) Find I_2 by mesh analysis. 10



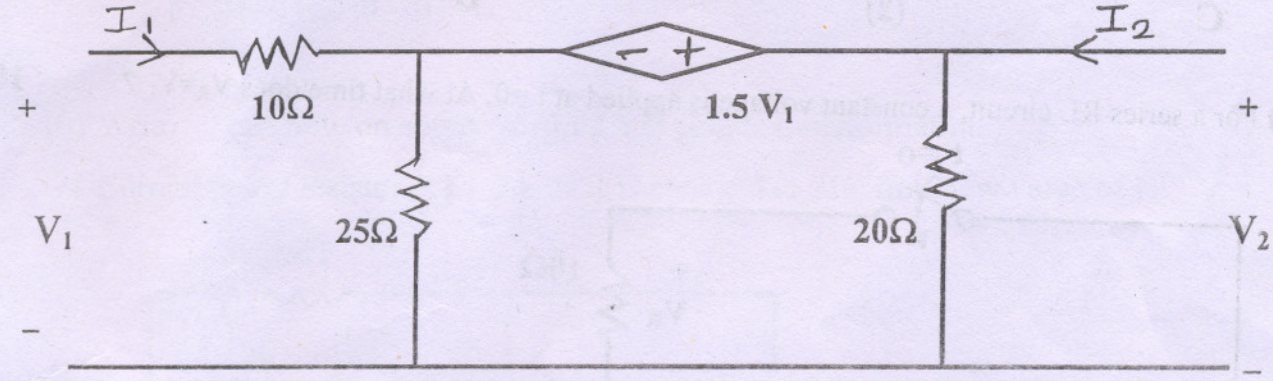
3 (a) Use mesh analysis and find all branch currents. 10



(b) Switch is opened at t =0. Solve for v , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t=0^+$ 10



4 (a) Find the transmission parameter for the two-port network shown. 10



(b) The Z parameter of a two port network are Z_{11} =20 Ω, Z_{22} =30 Ω, Z_{21}= Z_{12}=10 Ω. 10
Find Y and ABCD parameter of the network. Also find its equivalent T network

5 (a) Test whether following functions are positive real or not. 10

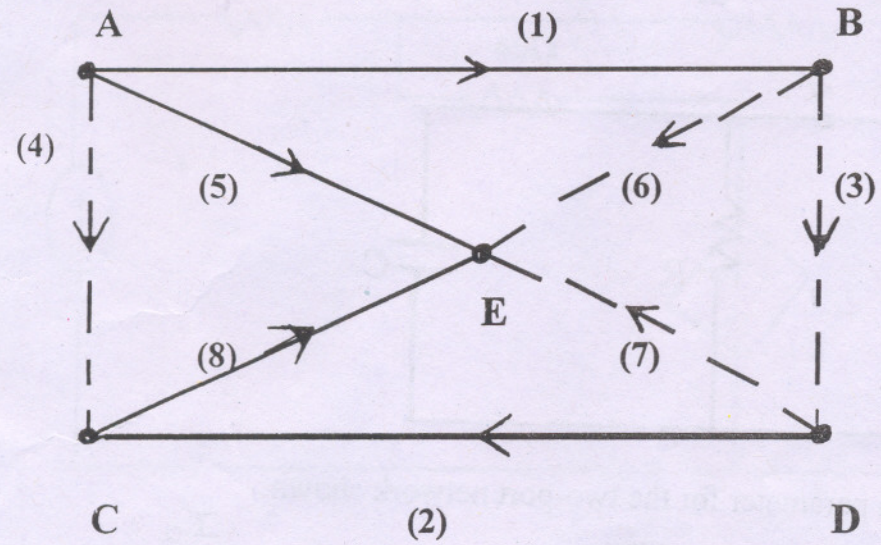
(i) $\frac{S+2}{S^2+3S+2}$ (ii) $\frac{S^2+6s+2}{S^2+3S+5}$

(b) $Y(S)=\frac{(S+2)(S+5)}{S(S+4)(S+6)}$ synthesize using Cauer-I and Cauer-II form. 10

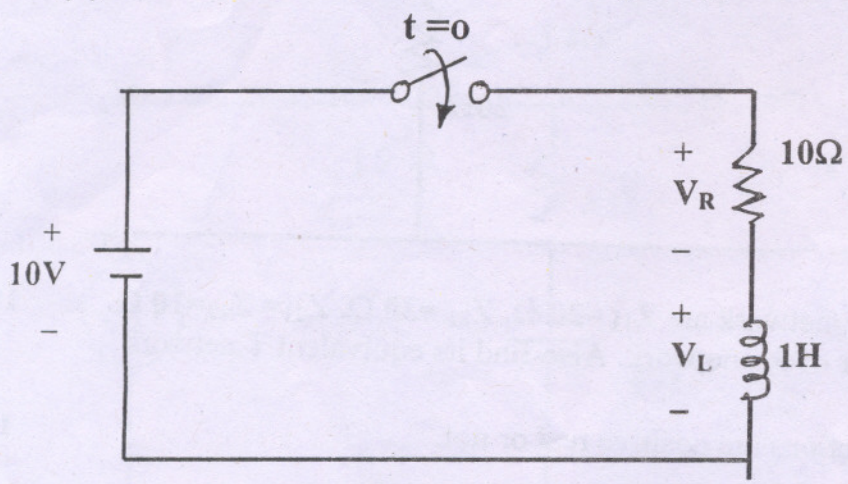
6 (a) Define and with suitable example differentiate between 10

i) Tree and Cotree
ii) f-cutest matrix and Tieset matrix
iii) Planer and nonplaner graph .

(b) Obtain Incidence matrix, Tieset matrix and f-cutest matrix for the graph shown. **10**



7 (a) For a series RL circuit, a constant voltage is applied at t =0. At what time does $V_R=V_L$? **10**



(b) In the network shown the switch is opened at t = 0 when steady state condition has been reached previously. Find i(t) for t>0 for open switch position. Use Laplace method. **10**