

n. 5913-08.

(REVISED COURSE)

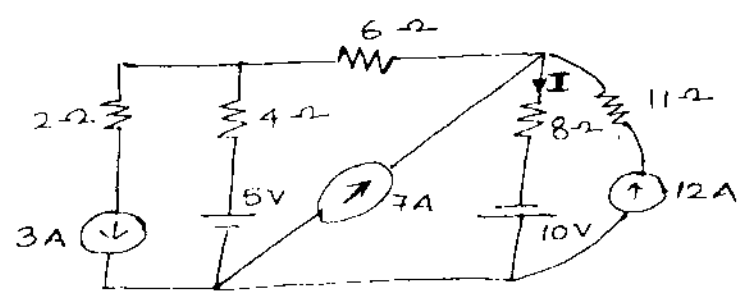
RC-8759

(3 Hours)

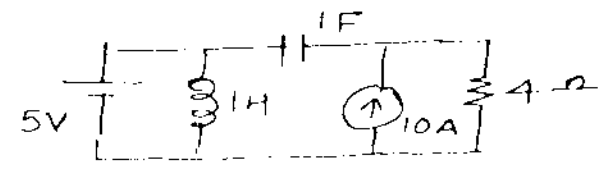
[Total Marks : 100

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

- a) Find condition of reciprocity for open-circuit impedance parameters. **5**
- b) For the network shown determine the current 'I'. **5**

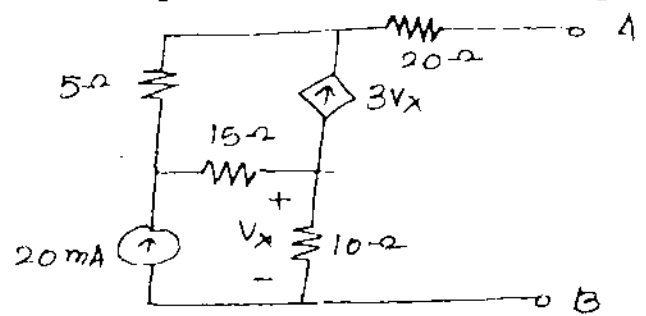


- c) For a given network determine possible no. of trees. **5**

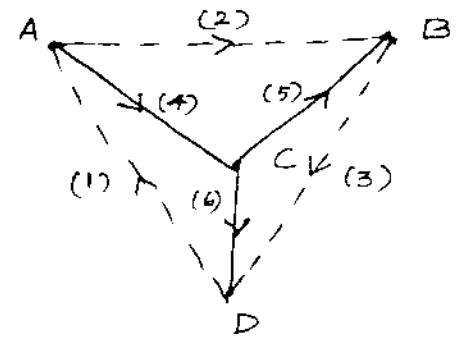


- d) Test whether the polynomial P(s) is Hurwitz or not— **5**
 $P(s) = s^6 + 6s^4 + 4s^2 + 2$

- a) Obtain Thevenin's equivalent circuit for the given network. **10**



- b) The oriented graph of a network is shown in **figure**. **10**
 Write (i) incidence matrix (ii) f-cutset matrix (iii) f-tieset matrix.



— Twigs
 - - - Links

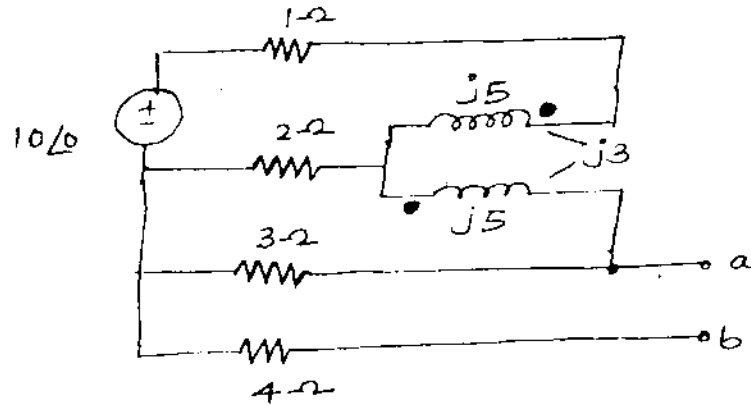
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3. (a) The transform voltage $V(s)$ of a network is given by :-

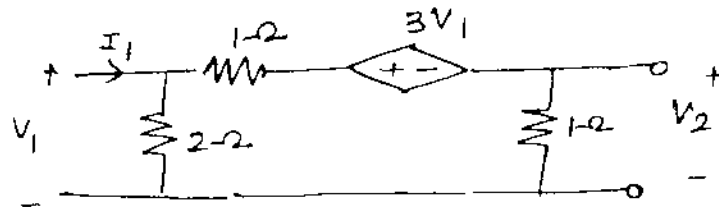
$$V(s) = \frac{3s}{(s-2)(s^2-2s-2)}$$

Plot its pole-zero diagram and hence obtain $V(t)$.

(b) Determine the voltage V_{ab} across the terminals a, b of the network shown.

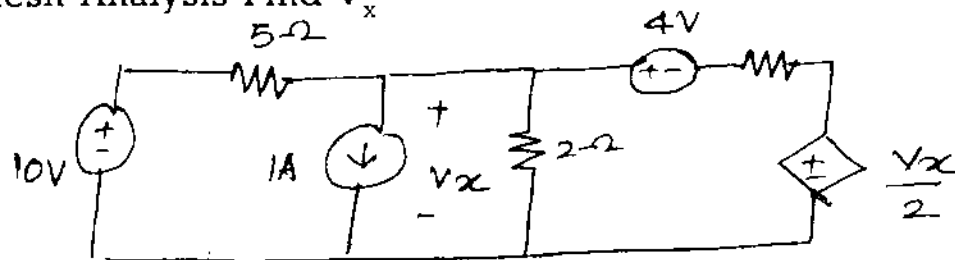


4. (a) For the given network determine transmission parameters and hence determine Y-parameters.

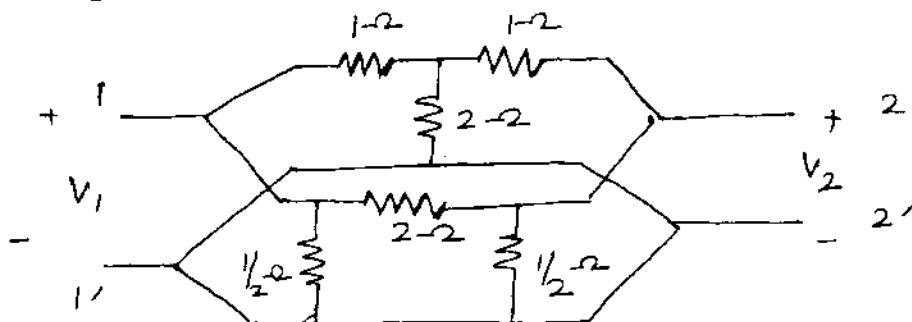


(b) Write short note on initial conditions and their significance in network analysis.

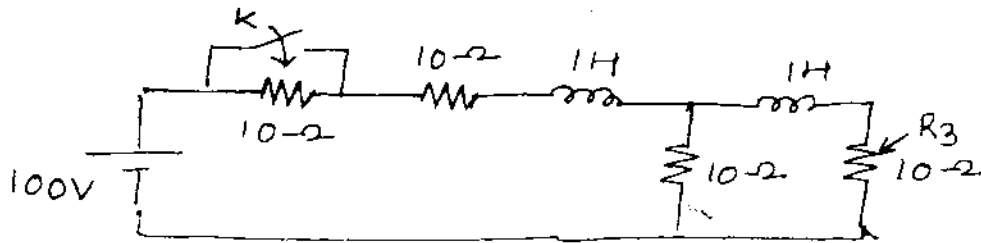
5. (a) Using Mesh Analysis Find V_x



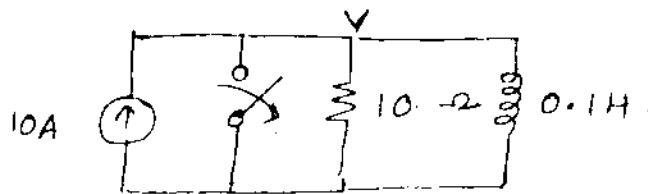
(b) Determine Y-parameters of the network.



- a) In the network shown below switch k is closed at $t = 0$, a steady state 15
having previously existed. Find the current in the resistor R_3 for
 $t > 0$.



- b) In the given circuit s/w k is opened at $t = 0$. Find the values of 5
 v , $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$ at $t = 0^+$.



- a) A designer requires the RC network with following data. 12
(i) Impedance function has simple poles at -2 , -6 .
(ii) It has simple zero at -3 and -7 .
(iii) $z(0) = 20 \Omega$.
Determine Foster I and II forms.
- b) Test whether following functions are positive real functions— 8

(i) $Y_1(s) = 5 \frac{s^2 + 2s + 1}{s^3 + 2s^2 + 2s + 40}$

(ii) $Y_2(s) = \frac{s^3 + 5s}{s^4 + 2s^2 + 1}$