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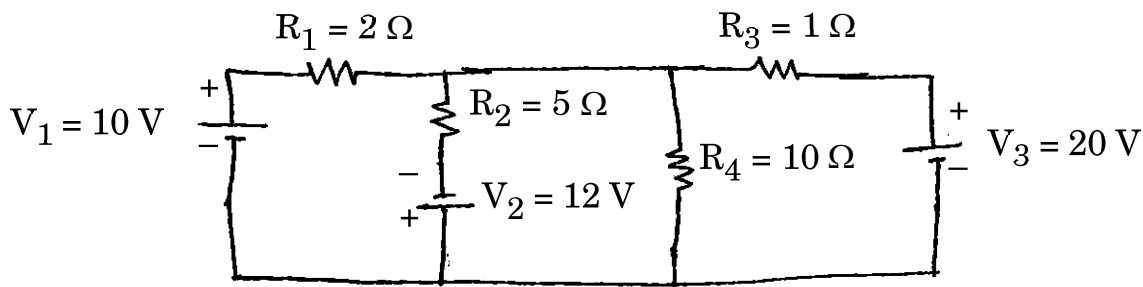
[4857]-1043**S.E. (Electronics/E&TC) (I Sem.) EXAMINATION, 2015****NETWORK THEORY****(2012 PATTERN)****Time : Two Hours****Maximum Marks : 50****N.B. :—** (i) Neat diagrams must be drawn wherever necessary.

(ii) Figures to the right indicate full marks.

(iii) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(iv) Assume suitable data, if necessary.

1. (a) For the network shown below, find the current through the $10\ \Omega$ resistor using Thevenin's theorem. [6]



- (b) A reduced incidence matrix of a graph is given by :

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

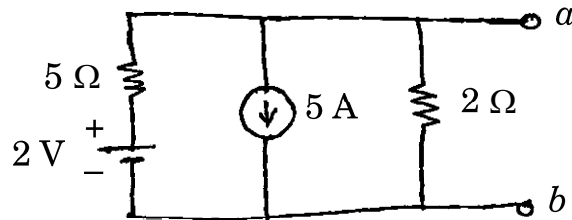
Obtain the number of possible trees.

[6]

P.T.O.

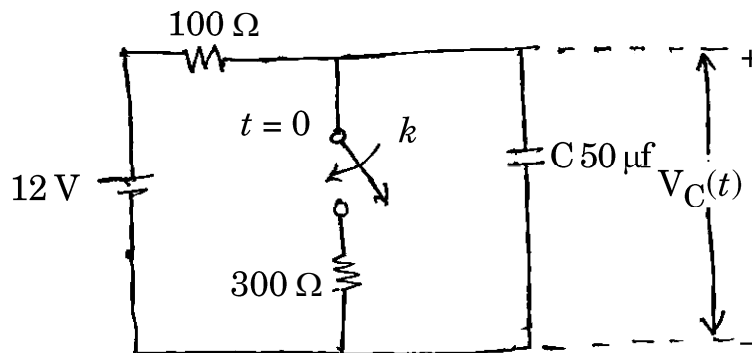
Or

2. (a) Find the Norton's equivalent circuit across a-b for the network shown : [6]



- (b) Explain the following terms with example : [6]
- (i) Directed graph
 - (ii) Incidence Matrix
 - (iii) Fundamental Tie-set matrix.

3. (a) For the network shown, initially switch is kept open for a long time and closed at $t = 0$. Find expression for $V_C(t)$. [6]

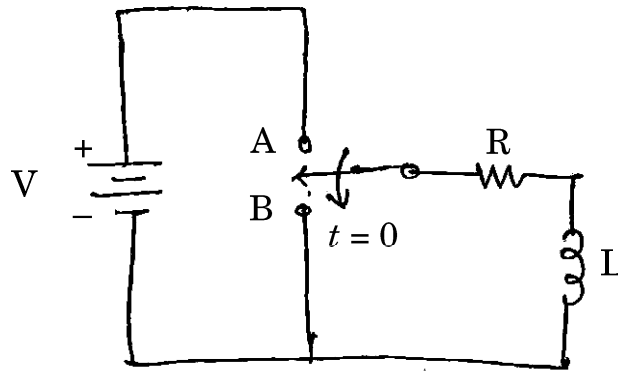


- (b) Define figure of merit. Prove that the bandwidth of a series resonant circuit is given by : [6]

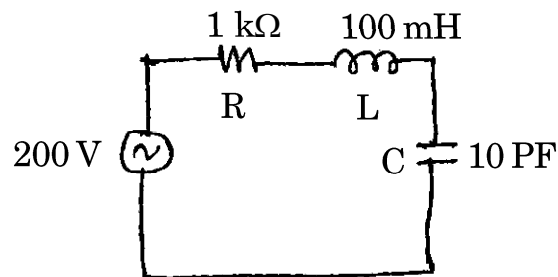
$$BW = (f_2 - f_1) = \frac{R}{2\pi L}$$

Or

4. (a) Derive the expression for current $i(t)$ for the series R_L circuit shown below. [6]



- (b) For the network shown, determine : [6]
- Resonance frequency
 - Quality factor
 - Half power frequencies

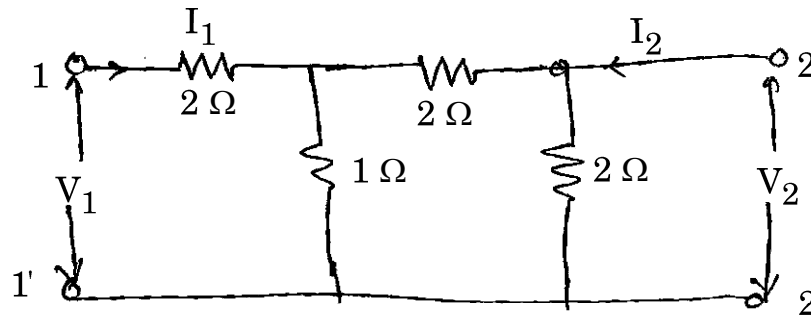


5. (a) Sketch the reactance curves for a constant-K T section HPF. Also obtain the expression for cut-off frequency. [7]
- (b) Derive expression for Z_{0T} in terms of open and short circuit impedances. [6]

Or

6. (a) What are low pass filter ? Derive expression for the cut-off frequency of prototype low pass filter in terms of L and C. [7]
- (b) Define decibel and neper units. How are they related to each other ? Derive the expression for the same. [6]

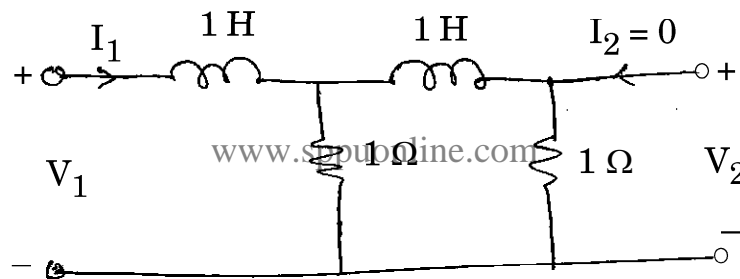
7. (a) For the network shown, derive the open-circuit impedance parameters and draw its equivalent circuit. [7]



- (b) Define Y-parameters and draw its equivalent circuit. [6]

Or

8. (a) Determine the voltage transfer function $\frac{v_2}{v_1}$ for the network shown below. [7]



- (b) Find out the driving point impedance function and voltage ratio transfer function for the given two port N/W. [6]

