Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[4857]-1043

S.E. (Electronics/E&TC) (I Sem.) EXAMINATION, 2015

NETWORK THEORY

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

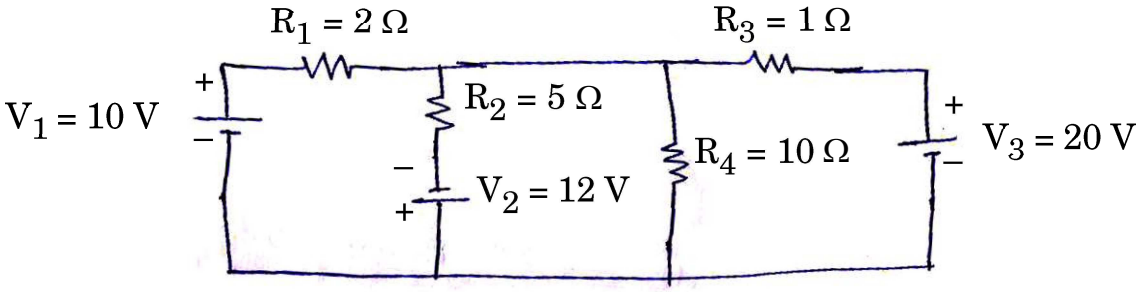
N.B. **:—** (*i*) Neat diagrams must be drawn wherever necessary.

(*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 Ω resistor using Thevenin's theorem. [6]



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

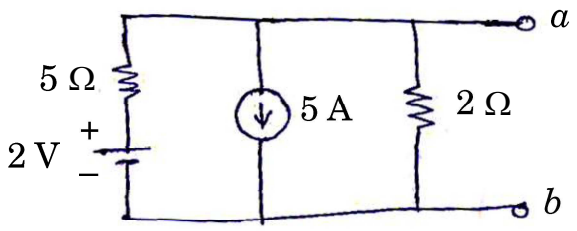
$$[A] = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 1 \\ 0 & -1 & 1 & -1 & 0 & 0 \\ -1 & 0 & -1 & 0 & -1 & 0 \end{bmatrix}$$

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]



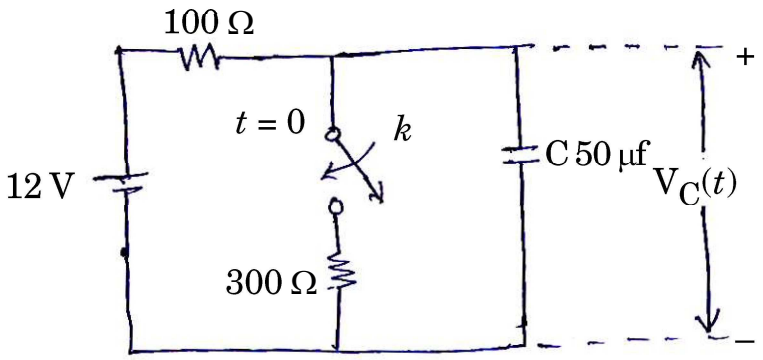
(*b*) Explain the following terms with example : [6]

(*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]

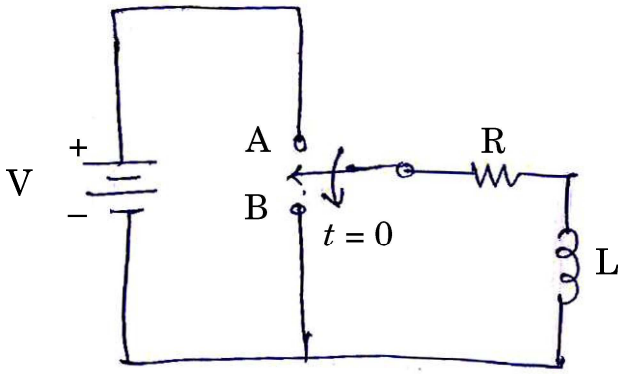


(*b*) Define figure of merit. Prove that the bandwidth of a series resonant circuit is given by : [6]

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

Or

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

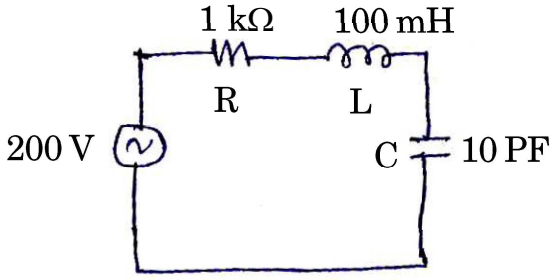


(*b*) For the network shown, determine : [6]

(*i*) Resonance frequency

(*ii*) Quality factor

(*iii*) Half power frequencies



5. (*a*) Sketch the reactance curves for a constant-K T sectoin HPF. Also obtain the expression for cut-off frequency. [7]

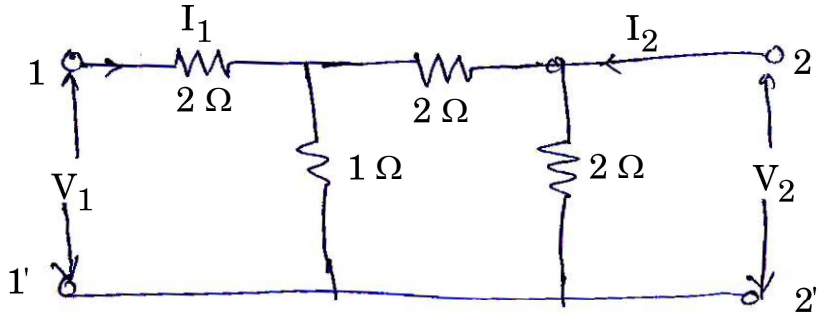
(*b*) Derive expression for Z_{0T} in terms of open and short circuit impedances. [6]

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]

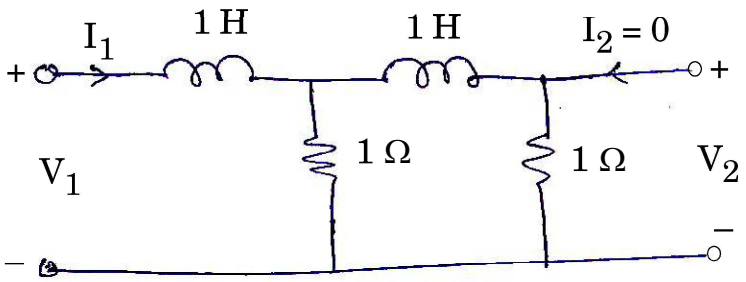
7. (*a*) For the network shown, derive the open-circuit impedance parameters and draw its equivalent circuit. [7]



(*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]