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

Seat No.	

[5668]-137

S.E. (E&TC/Elect.) (First Sem.) EXAMINATION, 2019

NETWORK THEORY

(2012 PATTERN)

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

N.B. **:—** (*i*) Neat diagram 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 table is allowed.

(*iv*) Assume suitable data, if necessary.

1. (*a*) State KVL and KCl. [6]

(*b*) The reduced incidence matrix is : [6]

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

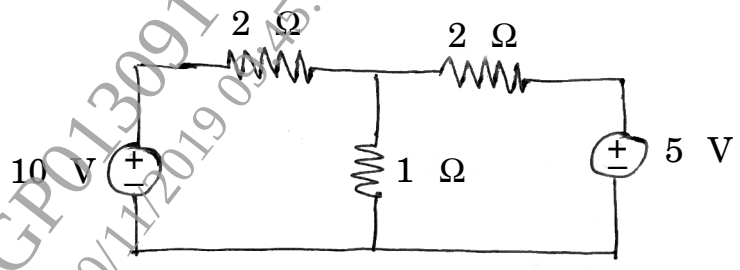
(*i*) Draw the graph.

(*ii*) How many trees are possible ?

P.T.O.

Or

2. (*a*) Find the current through 1 Ω using superposition theorem. [6]



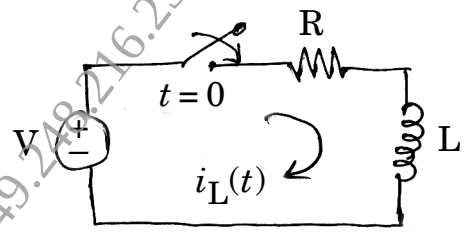
(*b*) Explain with neat diagram : [6]

(*i*) Oriented graph

(*ii*) Tree

(*iii*) Co-tree.

3. (*a*) Derive the expression for current through inductor for $t \geq 0$. [6]



(*b*) Define the following terms : [6]

(*i*) Resonant frequency

(*ii*) Bandwidth

(*iii*) Quality factor.

Or

4. (*a*) Draw transient response for 2nd order RLC circuit and explain rise time and settling time. [6]

(*b*) A series resonant circuit has a bandwidth of 200 Hz and contains a 10 mH inductance and a 10 μF capacitance. Determine : [6]

(*i*) f_0

(*ii*) Q_0 and

(*iii*) Impedance Z at resonance.

5. (*a*) What is Filter ? Explain different types of filters in brief (any *two*). [6]

(*b*) Design symmetrical T type attenuator with attenuation of 40 dB and design resistance of 1200 Ω. [7]

Or

6. (*a*) Design a constant *k* type low pass filter with the following specifications : (Both T & π) [6]

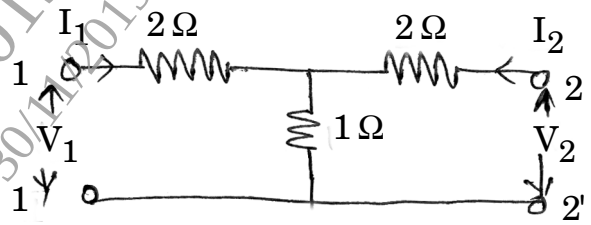
Design resistance R_0 = 600 Ω and

Cut-off frequency F_c = 10 kHz.

(*b*) Explain the terms Decibel and Neper. Derive relation between them. [7]

7. (*a*) Derive the condition of symmetry and reciprocity for Z-parameters. [6]

(*b*) Find the Z-parameters and verify reciprocity and symmetry conditions. [7]



Or

8. (*a*) Derive the condition of symmetry and reciprocity for Y-parameters. [6]

(*b*) Define the terms poles and zeros for Network function. And explain network stability with the help of pole zero plot. [7]