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

Seat No.	

[5459]-135

S.E. (E & TC/Electronics) (I Sem.) EXAMINATION, 2018

NETWORK THEORY

(2012 PATTERN)

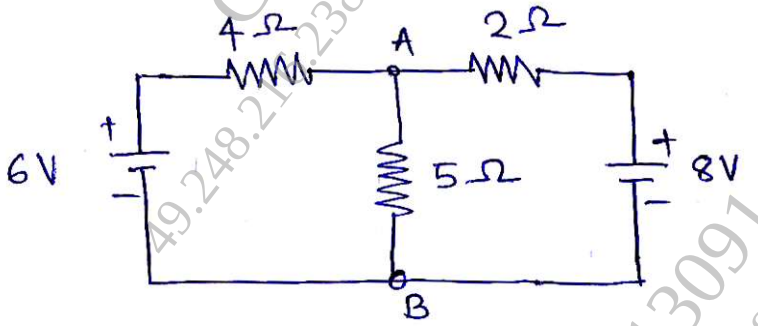
Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6** and Q. No. **7** *or* Q. No. **8**.

(*ii*) Figures to the right indicate full marks.

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

1. (*a*) Find current through branch AB using Thevenin's theorem. [6]



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

(*i*) Oriented graph

(*ii*) Tieset matrix

(*iii*) F-cutset matrix.

P.T.O.

2. (*a*) State and explain maximum power transfer theorem. [6]

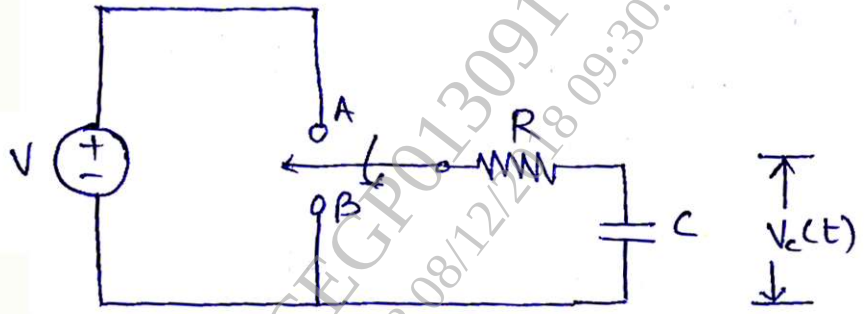
(*b*) The reduced incidence matrix is : [6]

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

(*i*) Obtain complete incidence matrix.

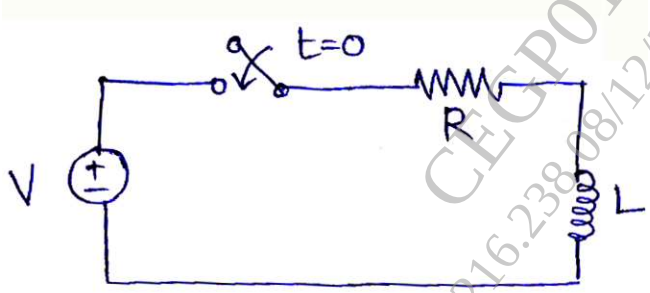
(*ii*) No. of trees possible.

3. (*a*) Derive the expression for the voltage $V_c(t)$ across capacitor for the series RC circuit shown. [6]



(*b*) Define the term quality factor. Prove for a series RLC resonant circuit $f_0 = \sqrt{f_1 f_2}$. [6]

4. (*a*) For the circuit shown below, find the current $i(t)$ for all time $t > 0$. [6]



(*b*) A series resonant circuit has a bandwidth of 100 Hz and contains a 20 mH inductance and a 20 μf capacitance. Determine : [6]

(*i*) f_0

(*ii*) Q_0 and

(*iii*) Impedance Z at resonance.

5. (*a*) What is symmetrical network ? Explain *two* characteristics of symmetrical network. [6]

(*b*) Design a constant K T type low pass filter with the following specifications : [7]

Design resistance R_0 = 560 Ω and

Cut-off frequency f_c = 2 KHz.

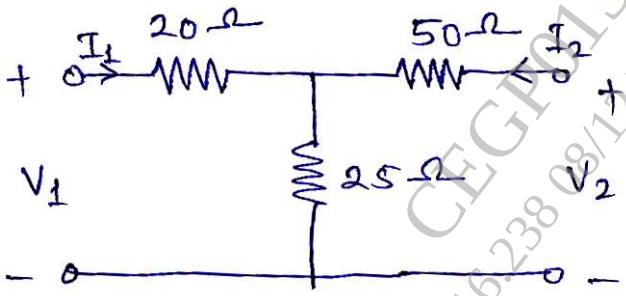
6. (*a*) Design symmetrical T attenuator with attenuation of 20 dB and design resistance of 600 Ω. [6]

(*b*) A symmetrical T network is composed of pure resistance has the following values of open and short circuit impedance :

Zoc = 800 Ω Zsc = 600 Ω

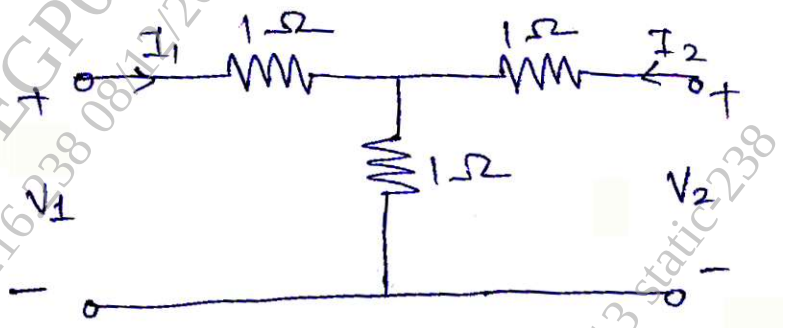
Determine characteristic impedance z_0, z_1 and z_2 for the T network. [7]

7. (*a*) Find *z*-parameters for the two port network shown below. State whether the network is symmetrical/asymmetrical. [7]



(*b*) Find the condition of symmetry and reciprocity of Y parameters. [6]

8. (*a*) Find *h*-parameters for the n/w shown in fig. [6]



(*b*) Explain the applications of Laplace Transforms to circuit analysis. [7]