Total No. of Questions—**8**] [Total No. of Printed Pages—**6**

Seat No.	

[5152]-133

S.E. (E&TC/Electronics) (I Sem.) EXAMINATION, 2017

NETWORK THEORY

(2012 PATTERN)

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

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

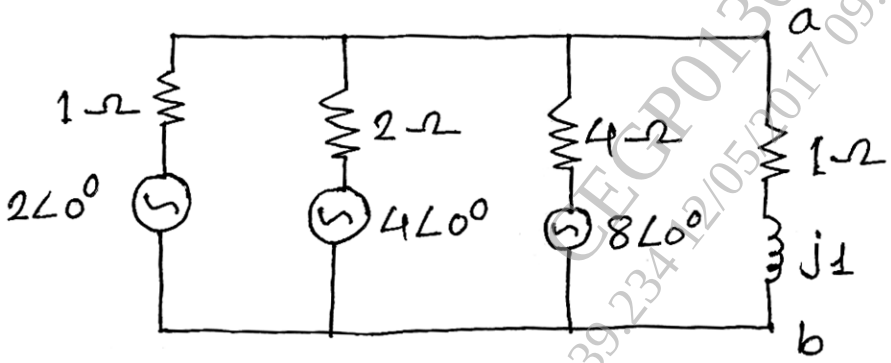
(*ii*) Figures to the right indicate full marks.

(*iii*) Your answers will be valued as a whole.

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

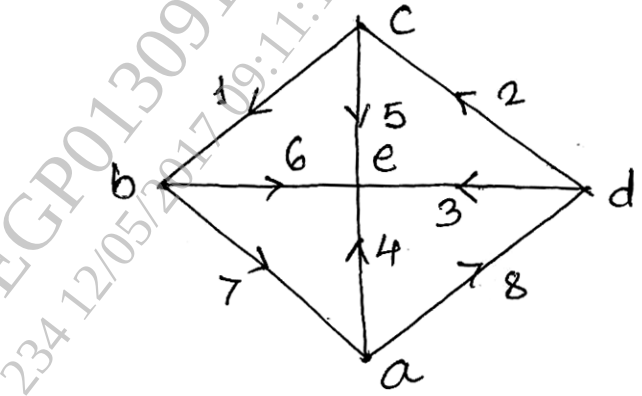
(*v*) Assume suitable data, if necessary.

1. (*a*) Find the current passing through the impedance (1 + *j*1) in the circuit shown below, using Nortons theorem. [6]



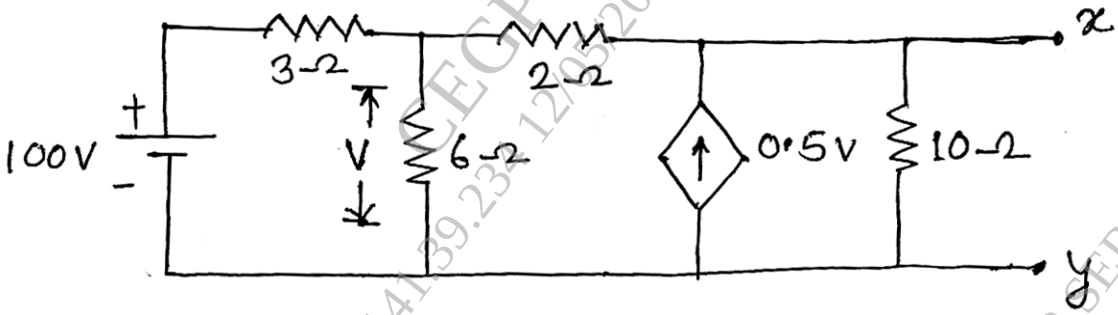
P.T.O.

(*b*) What is meant by oriented graph ? Find the voltage drop equations for the oriented graph shown below. [6]



Or

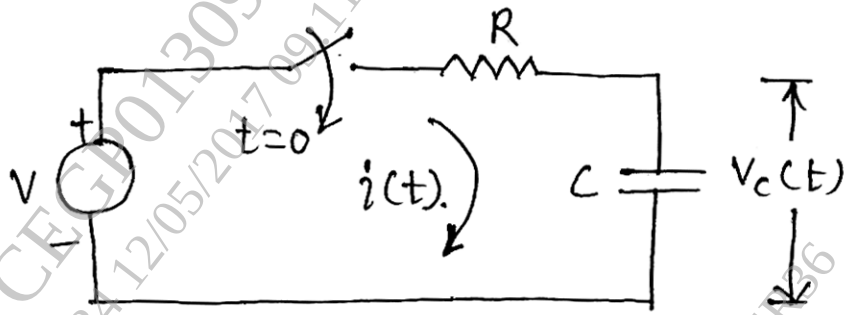
2. (*a*) State Norton's theorem and find the Norton's equivalant circuit at the terminals *xy* of the circuit shown below. [6]



(*b*) Explain the tree with example and determine the possible numbers of tree of a incidence matrix [A] of a graph is given by : [6]

$$[A] = \begin{bmatrix} -1 & 0 & 0 & 1 \\ 1 & -1 & 1 & 0 \\ 0 & 1 & -1 & -1 \end{bmatrix}_{3\times 4}$$

3. (*a*) Derive the expression for voltage across the capacitor and current flowing through it of circuit shown below : [6]



(*b*) For a parallel rersonant circuit, find :

(*i*) Specify the value of the circuit capacitor

(*ii*) Resistance of the circuit at parallel resonance

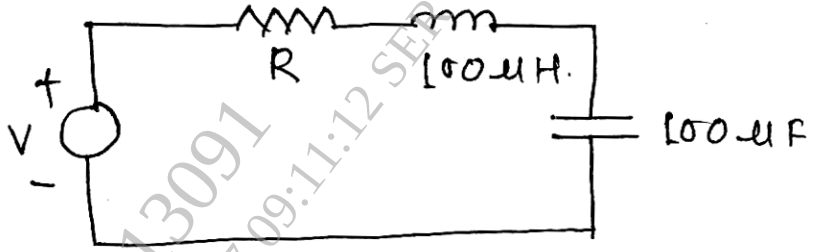
(*iii*) What is the absolute bandwidth of the resonant circuit ?

(*iv*) The bandwidth of the circuit, when it is matched with the generator impedance.

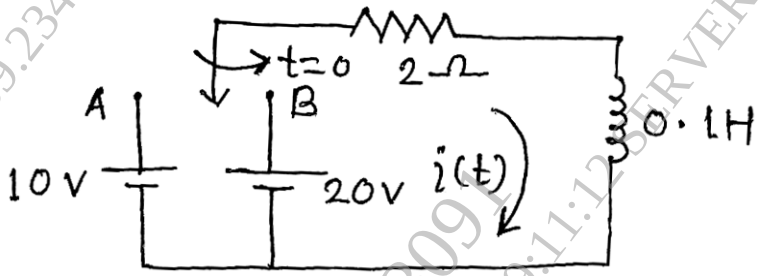
When Q = 75, L = 120 μH and resonating frequency of 1 MHz. [6]

Or

4. (*a*) The series resonant circuit has a lagging phase angle of 30° at ω_H = 12000 rad/sec. at what frequency will be leading by 30°. [6]

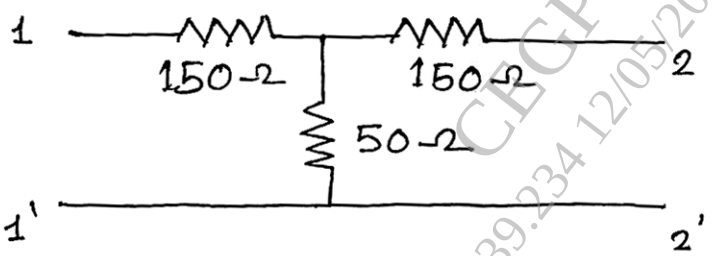


(*b*) The circuit shown below find, the current flowing through the inductor, when switch is at position 'A' and 'B'. [6]



5. (*a*) Design a HPF, 'T' and 'π' section to work into impedance 500 Ω, and have a cut-off frequency of 1 kHz. For this, calculate the phase angle 'β' at frequency 1.5 kHz and attenuation 'α' in neper at frequency of 0.9 kHz. [7]

(*b*) A symmetrical 'T' attenuator shown below. Find OC & SC impedance, Z_0. attenuation conatant in dB : [6]

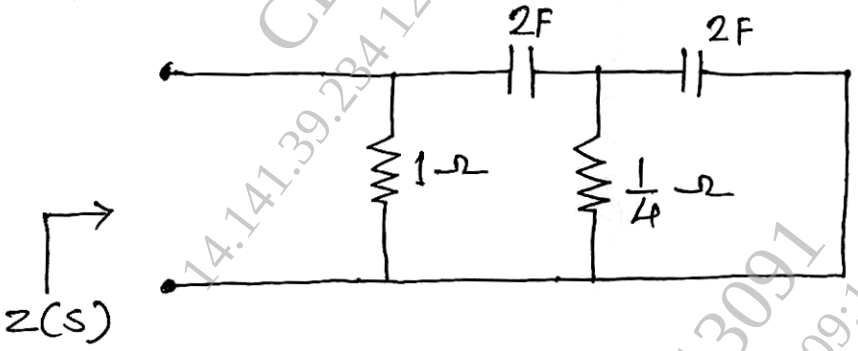


Or

6. (*a*) Design a constant 'K' Π section HPF to have a design impedance of 600 Ω The filter must have attenuation of 8.11 dB at 4.5 kHz and for this design calculate, phase angle in degree at frequency 5.5 kHz. [6]

(*b*) Find the image and iterative impedance for the asymmetrical 'L' section whose series arm impedance is 400 Ω and shunt arm impedance is 600 Ω. Derive the formula used. [7]

7. (*a*) What is meant by poles and zeros ? For the network shown below find the Z(*s*) : [7]



(*b*) The Z-parameter of a circuit are given by : [6]

$$\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}.$$

Obtain the transmission parameters.

Or

8. (*a*) Derive the condition of Reciprocity and symmetry for the ABCD parameter. [6]

(*b*) Determine the 'Y' parameters for the Network. [7]