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

Seat No.	

[5559]-157

S.E. (Electrical Engineering) (II Semester) EXAMINATION, 2019
NETWORK ANALYSIS
(2015 PATTERN)

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

N.B. **:—** (*i*) Answer Q. No. **1** *or* **2**, Q. No. **3** *or* **4**, Q. No. **5** *or* **6** and Q. No. **7** *or* **8**.
(*ii*) Neat diagrams must be drawn wherever necessary.
(*iii*) Figures to the right indicate full marks.
(*iv*) Assume suitable data, if necessary.

1. (*a*) Find the mesh transformation matrix of the given circuit : [6]

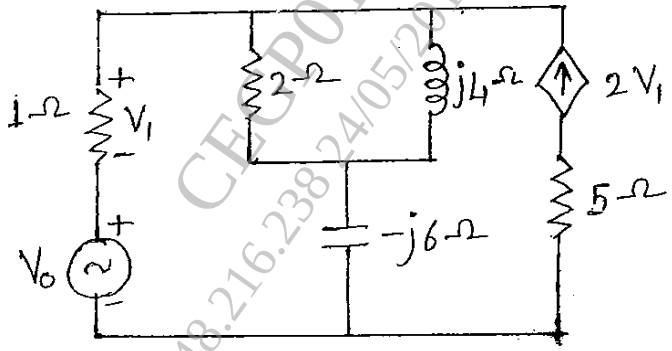

Fig. 1(a)

(*b*) Obtain Thevenin's equivalent of the ckt shown below : [7]

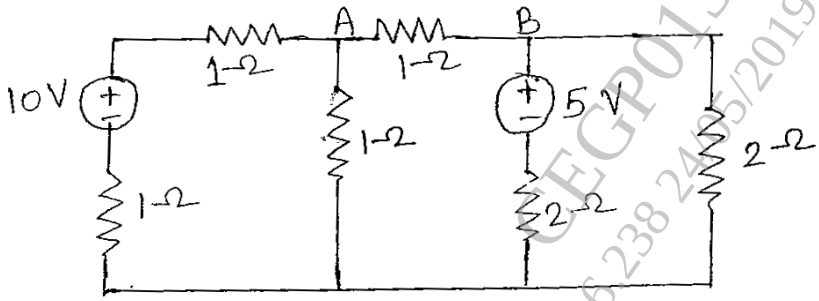

Fig. 1(b)

P.T.O.

Or

2. (*a*) Explain the concept of Duality with suitable examples. [6]

(*b*) Verify the reciprocity theorem for voltage 'V_C' and current 'I' in the network shown in fig. below : [7]

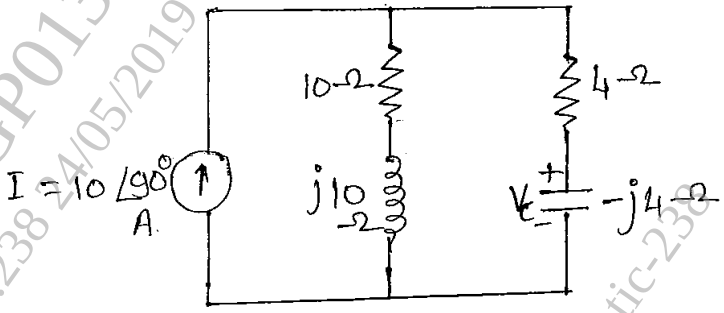

Fig. 2(b)

3. (*a*) RLC circuit is excited by D.C. voltage source. Find $i(t)$ using conventional method. The switch is closed at time $t = 0$: [6]

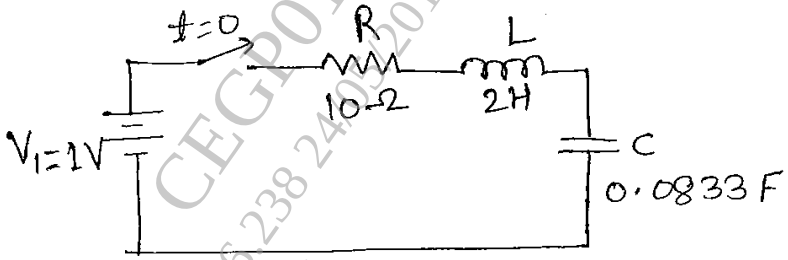

Fig. 3(a)

(*b*) For the network shown in fig., find $i(t)$ using Laplace transform with switch '*k*' opened at $t = 0$: [6]

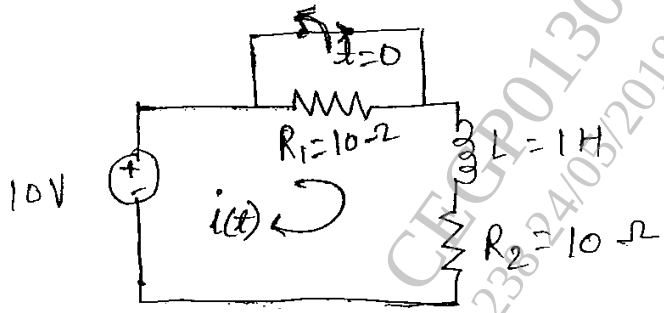

Fig. 3(b)

Or

4. (*a*) Find current equation when the switch is opened at $t = 0$: [6]

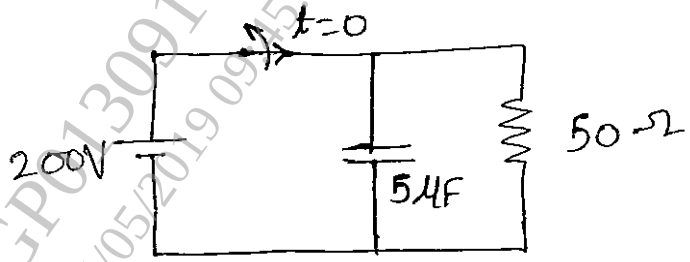

Fig. 4(a)

(*b*) A series RLC ckt has a constant voltage V = 10 V applied at $t = 0$. Using Laplace transfer find the resulting current if initial conditions are zero. [6]

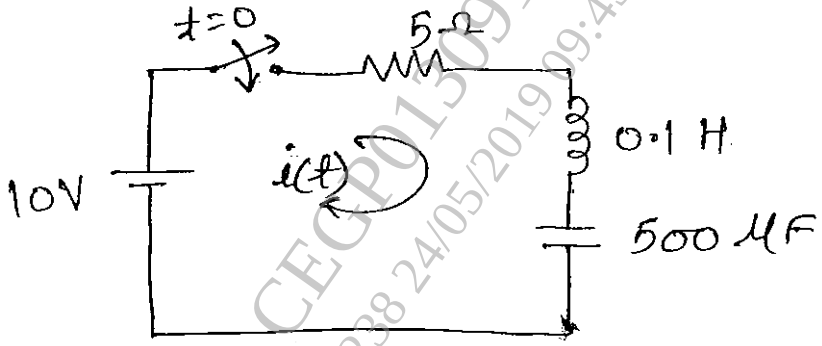

Fig. 4(b)

5. (*a*) Find '*h*' parameters of the network shown in fig. : [7]

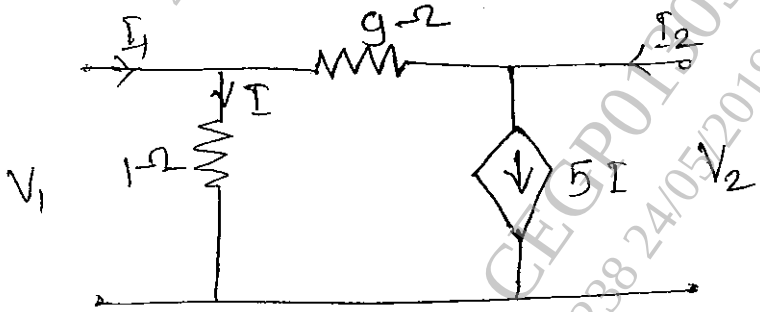

Fig. 5(a)

(*b*) State the restrictions on pole zero locations for driving point function and transfer function. [6]

Or

6. (*a*) Derive interrelation between 'Z' and transmission parameters. [6]

(*b*) For the given network function, draw pole-zero plot and obtain time domain response of voltage using graphical method : [7]

$$V(s) = \frac{5(s+5)}{(s+2)(s+7)}.$$

7. (*a*) What is filter ? Classify its four types and explain in detail. [6]

(*b*) Design a T and π section constant K high pass filter having cut-off frequency of 12 kHz and nominal impedance R_0 = 500 Ω. Also find : (*i*) Its characteristic impedance and phase constant at 24 kHz and (*ii*) attenuation at 4 kHz. [6]

Or

8. (*a*) Derive expression for characteristic impedance (Z_{0T} and $Z_{0\pi}$), attenuation constant (α), and phase constant (β) of constant K-type high pass filter from symmetrical network. [6]

(*b*) Design constant K-low pass filter to have a cut-off frequency of 796 Hz when terminated in a 600 Ω resistance in both the T and π configurations. [6]