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

Seat No.	

[5352]-548

S.E. (Electrical Engineering) (II Sem.) EXAMINATION, 2018

NETWORK ANALYSIS

(2015 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**, Q. No. **7** *or* Q. No. **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 I*x* and I*y* shown in Fig. 1 using Mesh analysis. [6]

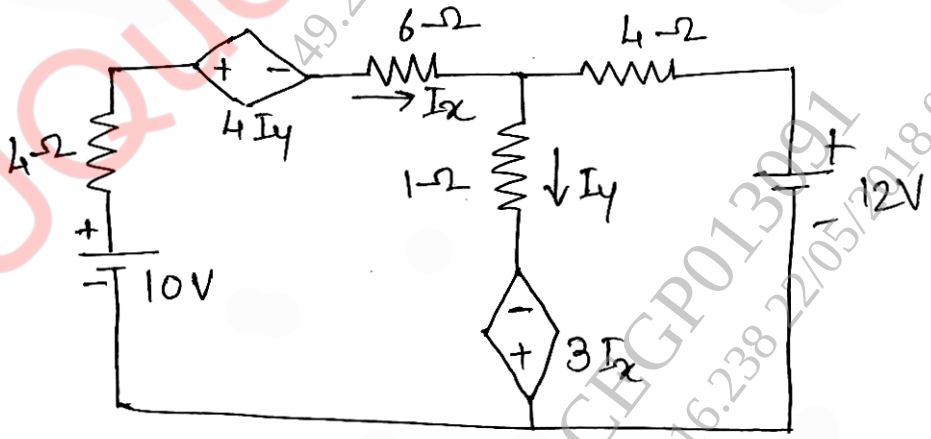

Fig. 1

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(*b*) Find the Thevenin's equivalent of the circuit shown in Fig. 2. [7]

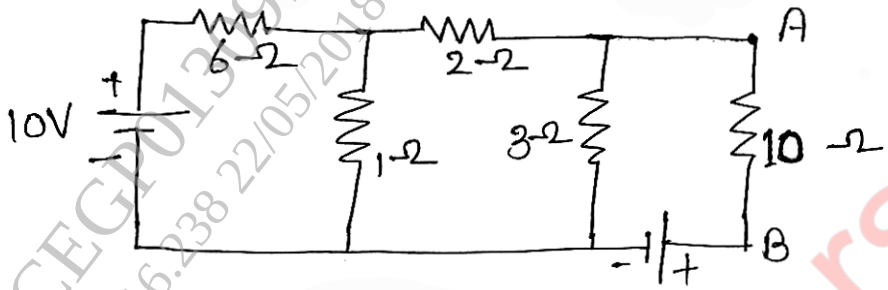

Fig. 2

Or

2. (*a*) Find the Mesh transformation matrix for the circuit shown in Fig. 3. [7]

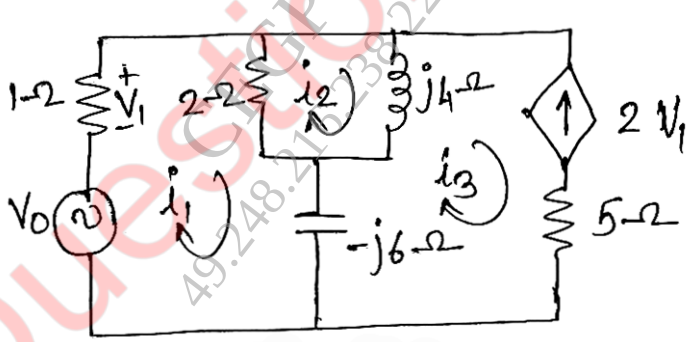

Fig. 3

(*b*) State and explain maximum power transfer theorem applied to a.c. circuit. [6]

3. (*a*) In Fig. 4 steady state condition is reached with 100 V d.c. source. At $t = 0$, switch k is suddenly opened. Find the expression

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of current through the inductor after t = ½ sec. [6]

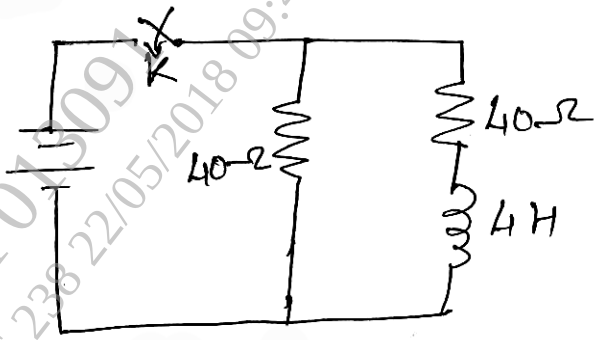

Fig. 4

(*b*) For the circuit shown in Fig. 5, obtain the current through the capacitor 'C' at $t = 0^+$ following switching at t = 0. Assume the capacitor to be initially discharged. [6]

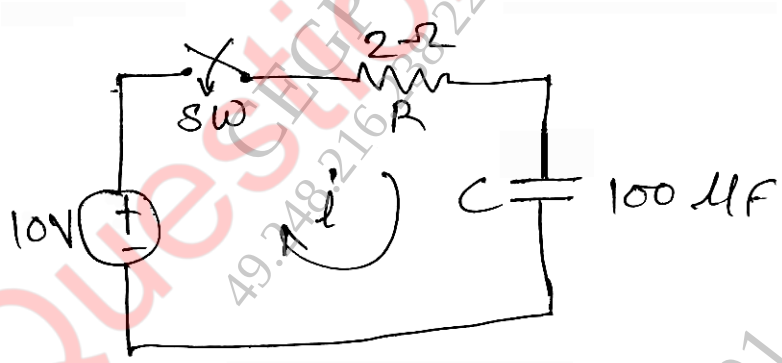

Fig. 5

Or

4. (*a*) The 10 μF capacitors in RC circuit of Fig. 6 has initial charge of 100 μc with polarities as shown in figure. At t = 0, the

switch being closed, a d.c. voltage of 100 V is applied. Find the expression for the current. [6]

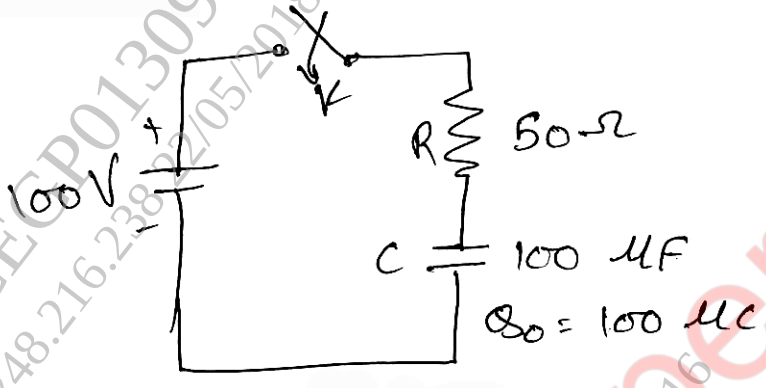

Fig. 6

(*b*) In the circuit shown in Fig. 7, the switch '*s*' is kept in position '1' for long period to establish the steady state conditions. The switch is then moved to position '2' at $t = 0$. Find out the expression for the current after switching the switch to position '2'. [6]

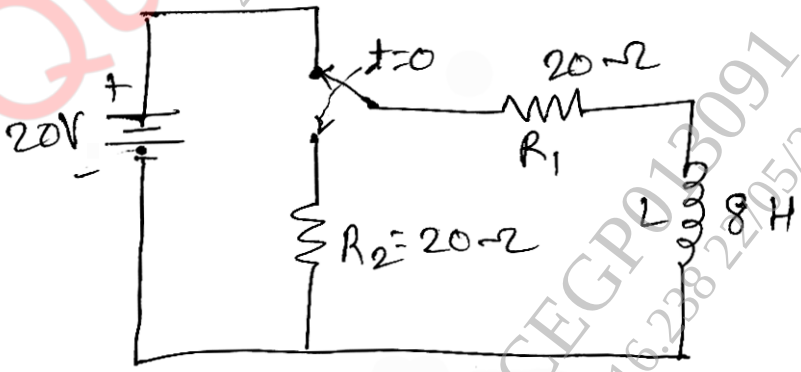

Fig. 7

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5. (*a*) Find 'Y' parameter for the circuit shown in Fig. 8. [7]

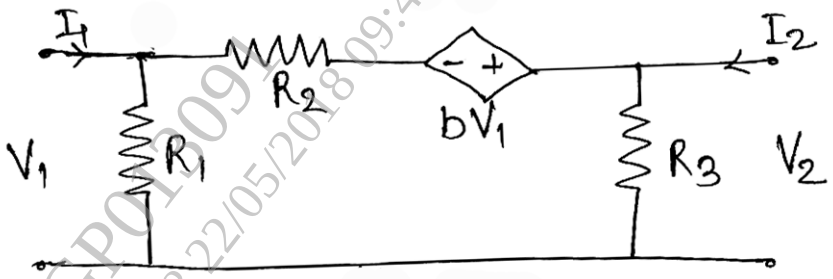

Fig. 8

(*b*) Write a short note on restriction on pole and zero location in transfer function. [6]

Or

6. (*a*) Develop relation between 'Z' parameter and transmission parameter. [6]

(*b*) Find the driving point admittance 'Y_{11}'(s) for the network shown in Fig. 9 and plot pole-zero diagram. [7]

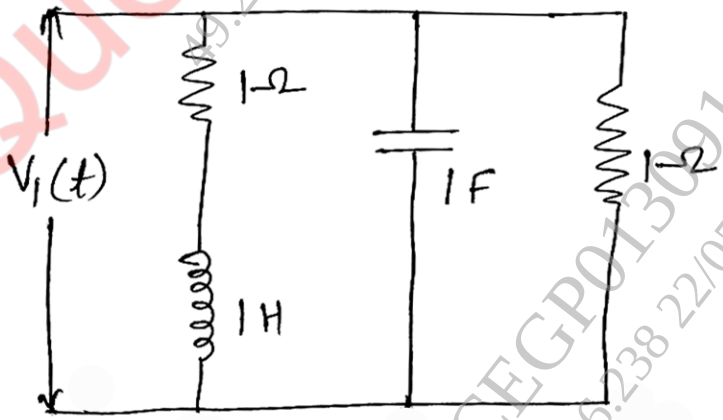

Fig. 9

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7. (*a*) Derive the expression for characteristic impedance (Z_0) attenuation constant (α) and phase constant (β) of prototype constant-K type low pass filter from symmetrical network. [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 : [6]

(*i*) Its characteristic impedance and phase constant at 24 kHz and

(*ii*) attention at 4 kHz.

Or

8. (*a*) Explain the following terms in relation with filters : [6]

(*i*) Cut-off frequency

(*ii*) Pass band

(*iii*) Stop band.

(*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]

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