Total No. of Questions—**8**] [Total No. of Printed Pages—**5**

Seat No.	

[5459]-157

S.E. (Electrical Engg.) (Second Semester) EXAMINATION, 2018

NETWORK ANALYSIS

(2015 PATTERN)

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

N.B. **:—** (*i*) Answer Q. Nos. **1** *or* **2**, Q. Nos. **3** *or* **4**, Q. Nos. **5** *or* **6**, Q. Nos. **7** *or* **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

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

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

1. (*a*) Using mesh analysis, find the magnitude of dependent source. [7]

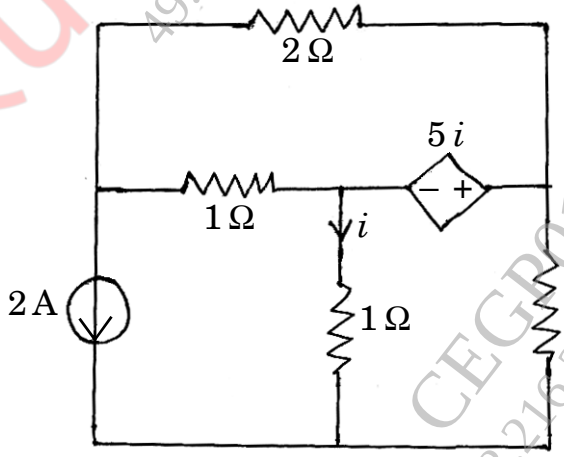

Fig. 1

P.T.O.

(*b*) Find Norton's equivalent circuit for the network shown in Fig. 2 : [6]

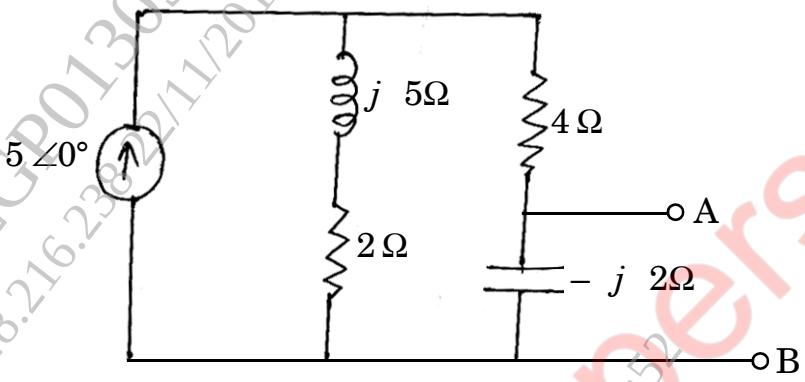

Fig. 2

Or

2. (*a*) State and explain the concept of duality with suitable example. [6]

(*b*) Using superposition theorem, calculate current '*i*' for the circuit shown in Fig. 3 : [7]

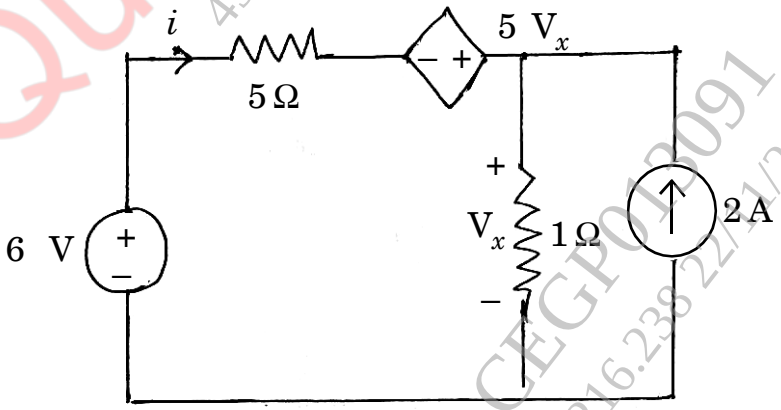

Fig. 3

3. (*a*) Using classical theory, find voltage across inductor at time t = 2, sec, after switch is opened : [6]

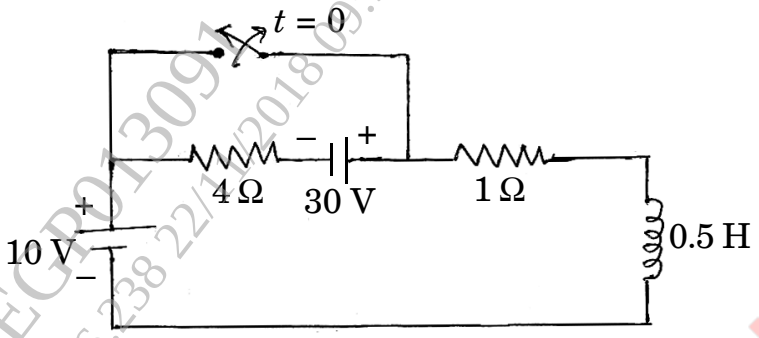

Fig. 4

(*b*) For the circuit shown in Fig. 5 solve for $i(t)$ using Laplace transform with switch 'k' closed at t = 0 : [6]

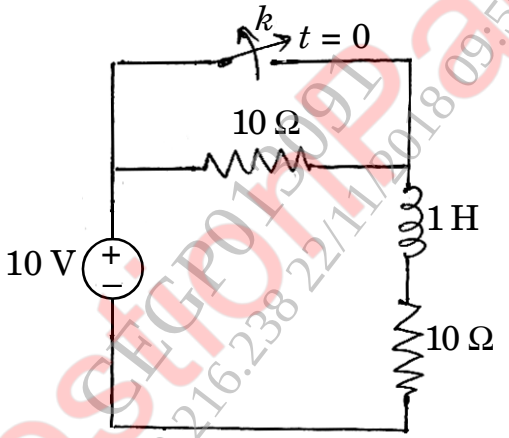

Fig. 5

Or

4. (*a*) R-L-C circuit is excited by D.C. voltage source. Find current $i(t)$ using conventional method. The switch is closed at time t = 0. [6]

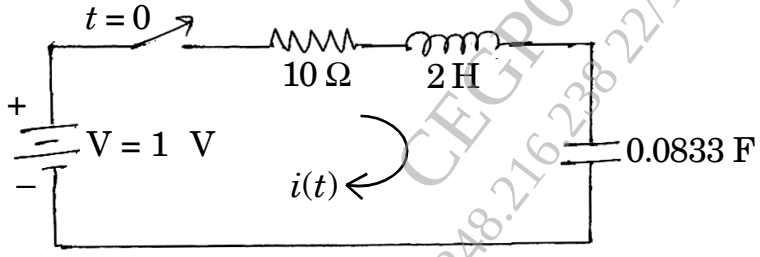

Fig. 6

(*b*) In the circuit shown in Fig. 7, the switch is moved to position 2 at time $t = 0$, find the expression of current for time $t > 0$, using Laplace transform : [6]

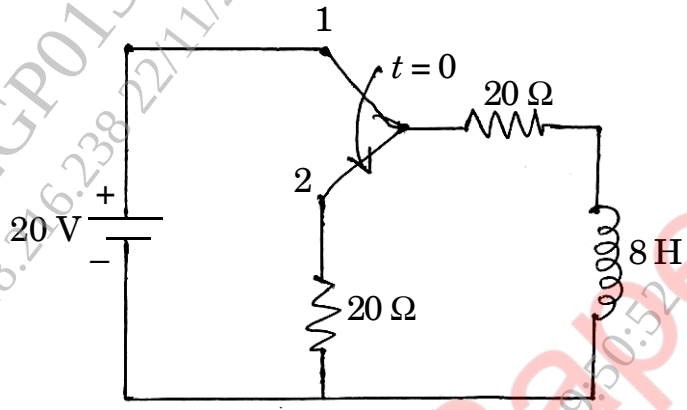

Fig. 7

5. (*a*) Obtain 'Y' parameters in terms of transmission parameters. [6]

(*b*) Draw poles and zeros plot in the S plane of the driving point impedance function for the network shown in Fig. 8 : [7]

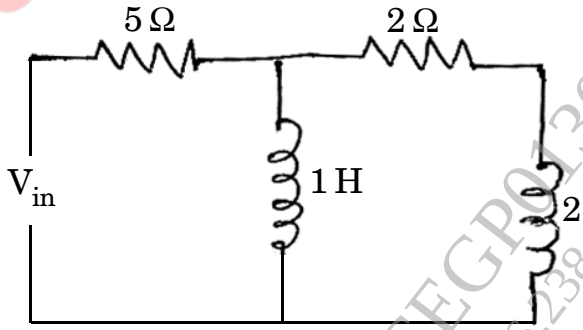

Fig. 8

Or

6. (*a*) Find transmission parameter for the network shown in Fig. 9 : [7]

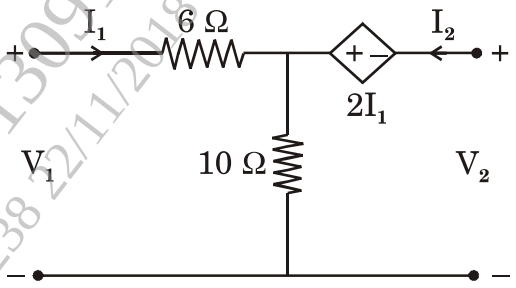

Fig. 9

(*b*) Explain the necessary conditions for transfer function. [6]

7. (*a*) Derive an expression for characteristic impedance (Z_{OT} and $Z_{O\pi}$), attenuation constant (α) and phase constant (β) of constant *k* high pass filter from symmetrical network. [6]

(*b*) Design a prototype low pass filter (π and T section) if design impedance R_0 = 500 Ω and cut-off frequency f_c = 2000 Hz. [6]

Or

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

(*i*) stop band

(*ii*) pass band

(*iii*) cut-off frequency.

(*b*) A prototype high pass filter has cut-off frequency of 10 kHz and design impedance of 600 Ω. Find value of L & C. Also find attenuation in dB and phase shift in degrees at frequency of 8 kHz. [6]