

Total No. of Questions—8]

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[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]

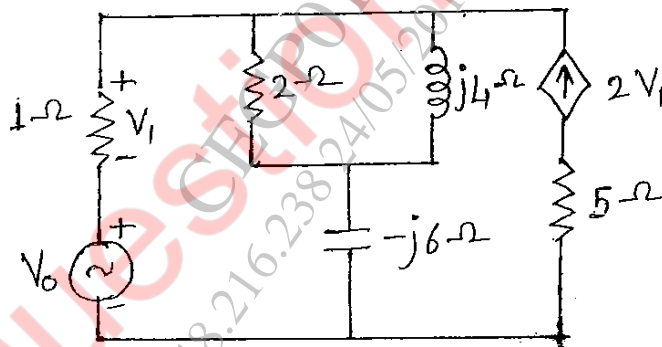


Fig. 1(a)

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

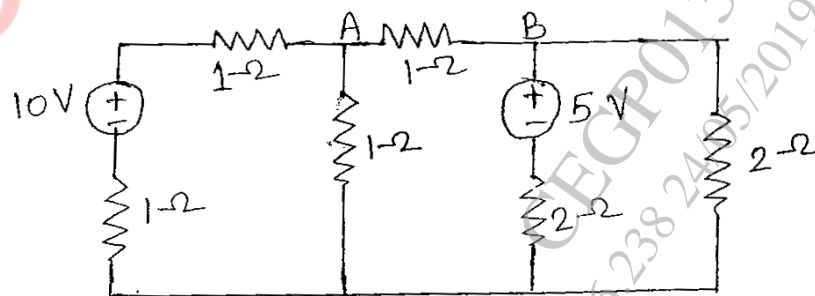


Fig. 1(b)

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]

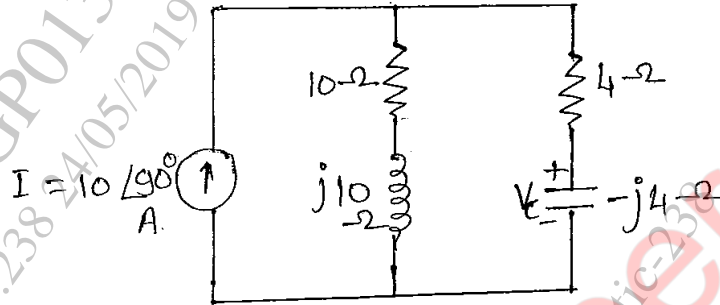


Fig. 2(b)

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]

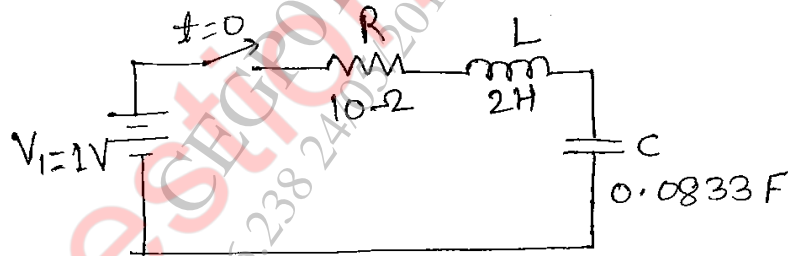


Fig. 3(a)

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

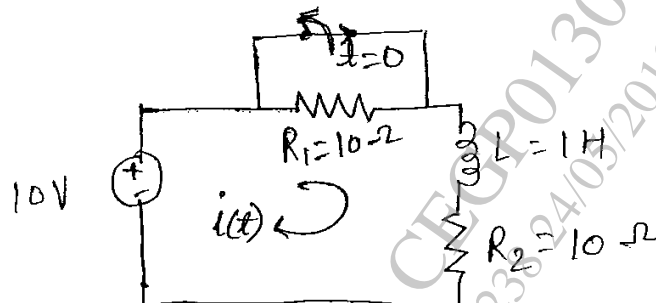


Fig. 3(b)

Or

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

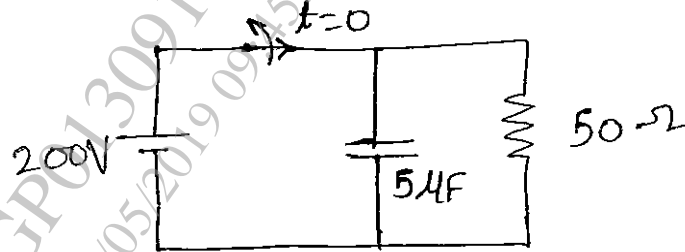


Fig. 4(a)

- (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]

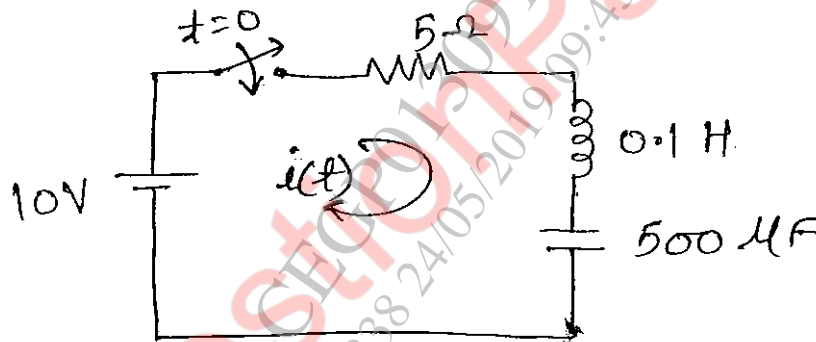


Fig. 4(b)

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

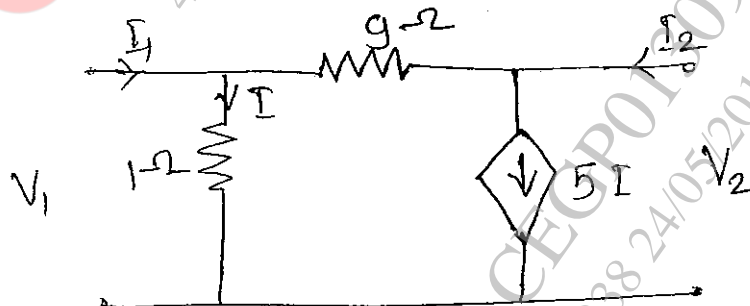


Fig. 5(a)

- (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 $R_0 = 500 \Omega$. 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 600Ω resistance in both the T and π configurations. [6]