S.E. Sem 3 (Rev.) EXTC / Electrical Networks 13/6/08

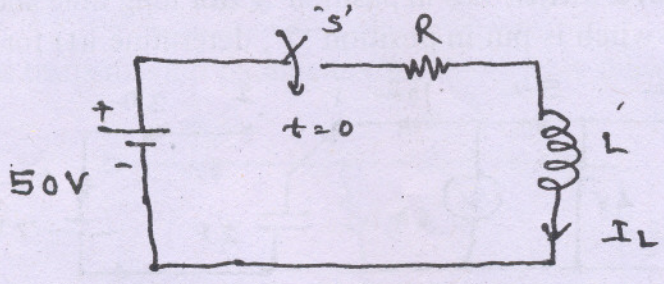
V-Ex-I-08-Scan-A-111

Con. 3311-08. **(REVISED COURSE)** **CO-9602**

(3 Hours) **[Total Marks : 100**

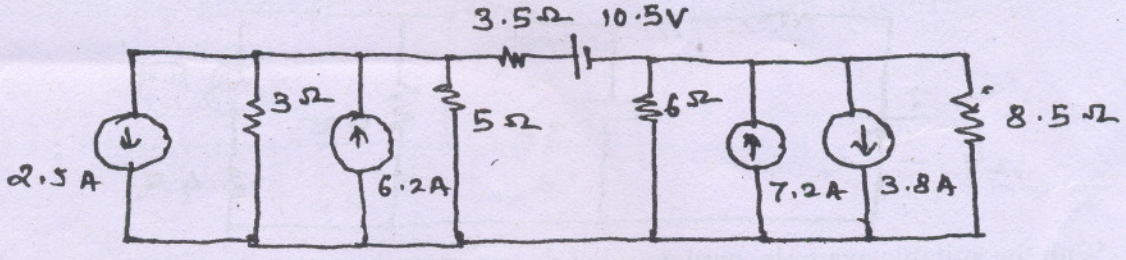
N.B. : (1) Question No.**1** is **compulsory**.
(2) Attempt any **four** questions from remaining **six** questions.
(3) Assume **suitable data** if **necessary** and **state** it **clearly**.

1. (a) State and explain properties of Hurwitz polynomial. **20**
(b) For the circuit shown in **figure** find and plot $I_L(t)$. The switch 's' is closed at t = 0 with zero initial condition.



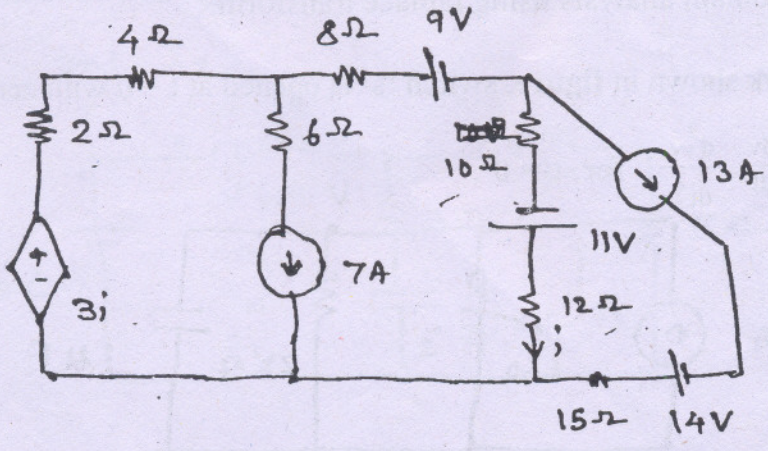
$R = 1\ k\Omega$
$L = 1\ mH.$

(c) For the circuit shown in **figure**, determine current through 6 Ω resistance using Nodal analysis.



(d) For the circuit used in **Q1(c), figure**, determine current through 6 Ω resistance using any method you know other than Nodal analysis.
(e) Write short note on interconnection of two port networks.

2. (a) For the circuit shown in **figure** determine current through 8Ω resistance. **10**

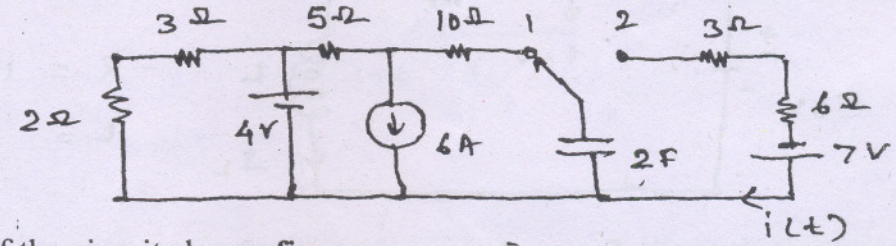


(b) Synthesize following network driving point impedances. **10**

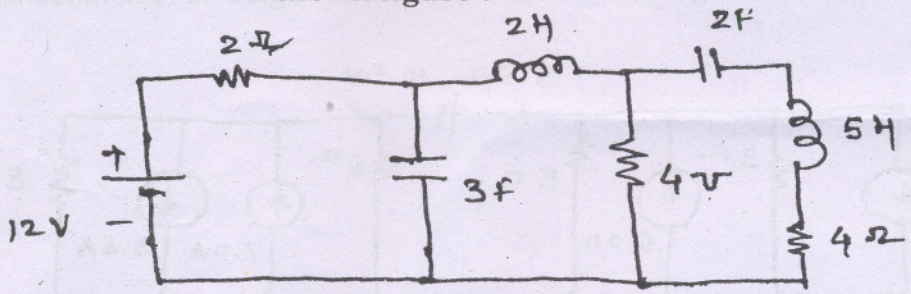
(i) $$z(s) = \frac{6s^3 + 2s}{9s^4 + 4s^2 + \left(\frac{1}{6}\right)}$$

(ii) $$z(s) = \frac{8\left(s^2 + 4\right)\left(s^2 + 25\right)}{s\left(s^2 + 16\right)}$$

3. (a) For the circuit shown in **figure**, switch was in position '1' for long time and steady state is reached. Now at t = 0, switch is put in position '2', determine i(t) for t > 0. **10**



(b) Draw dual of the circuit shown **figure** :— **5**

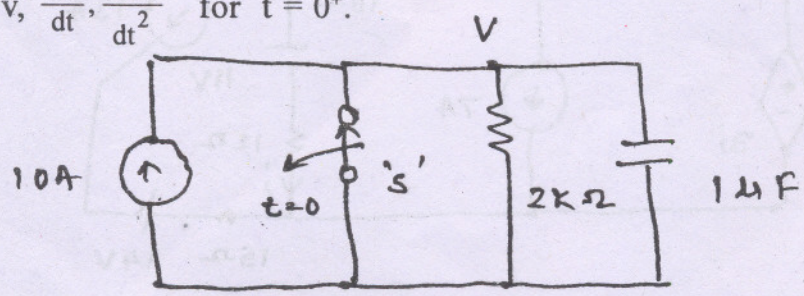


(c) With the suitable example, explain what do you mean by source transformation and shifting. Explain how these methods are used in network analysis. **5**

4. (a) Write short notes on (any **two**) :— **10**
   (i) Positive real function.
   (ii) Time domain response of R-L-C series circuit.
   (iii) Time domain analysis using laplace transform.

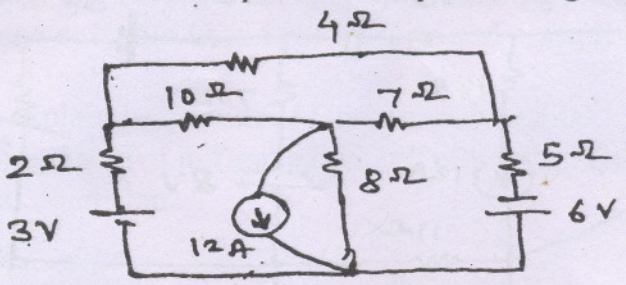
(b) For the network shown in **figure**, switch 's' is opened at t = 0 with zero initial condition. **10**

Solve for v, $\frac{dv}{dt}, \frac{d^2v}{dt^2}$ for $t = 0^+$.

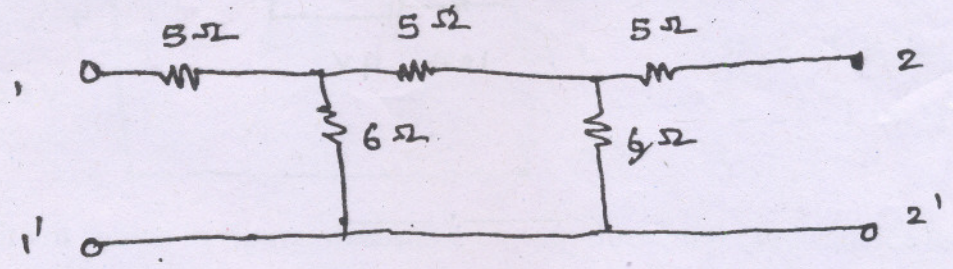


5. (a) With reference to network graph theory explain Tieset and Cutset matrix and how they are used to get network solution based on KVL and KCL. Also derive necessary equation to perform network analysis using this graph theory. **10**

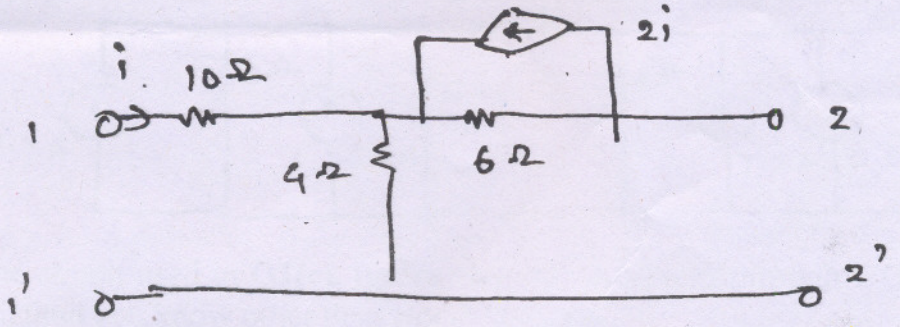
(b) For the network shown in **figure**, determine current through 7Ω resistance using graph theory. Use KVL based equilibrium equation to get the solution. **10**



6. (a) (i) Find transmission parameters for the circuit shown in **figure.** **10**

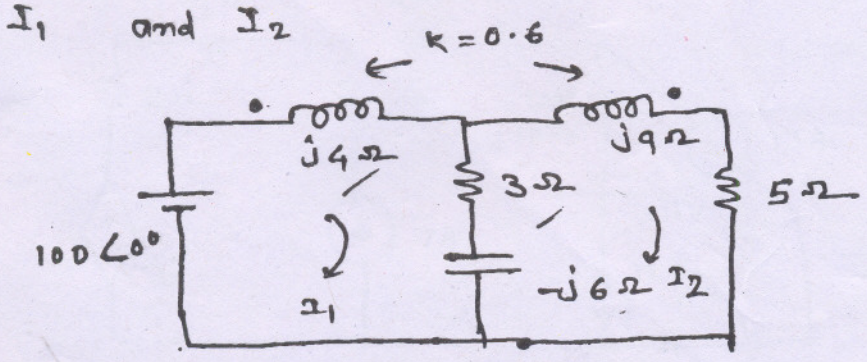


(ii) Determine y-parameters for the two port network shown in **figure.**



(b) Explain with appropriate example synthesis of RL driving point impedance and admittance function. **10**

7. (a) For the network shown in **figure**, determine I_1 and I_2. **10**



(b) For the network shown in **figure.** Determine R_L for maximum power transfer and maximum power transferred. Use Norton's theorem to get the solution. **10**