

[3 Hours]

Maximum Marks: 80

Note: i) Question No. 1 is Compulsory

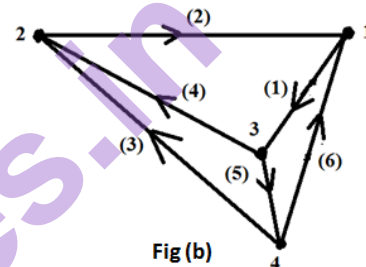
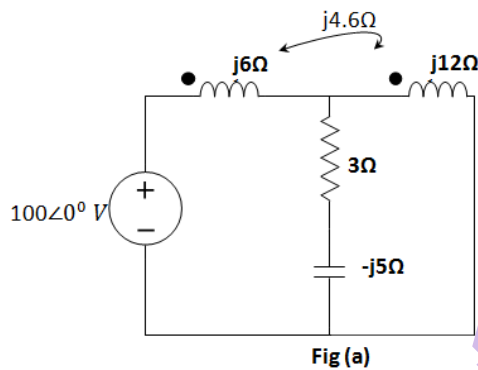
ii) Attempt Any Three questions from remaining

iii) Assume suitable data if necessary

1. Attempt the following:

(20)

- Find the condition of reciprocity for Transmission parameters.
- Define Transfer Function of a Network. What are the restrictions on Poles and Zeros location for transfer function?
- Write the mesh equations for the circuit shown in fig (a).
- For network given in fig (b) write:
 - Incidence Matrix
 - f-Cutset Matrix
 - Tieset Matrix



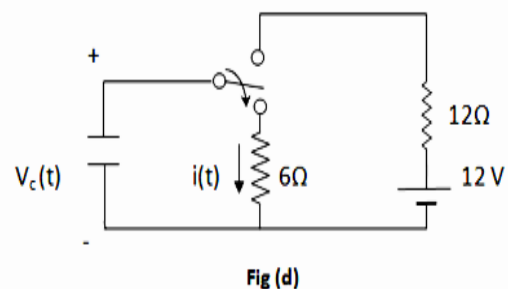
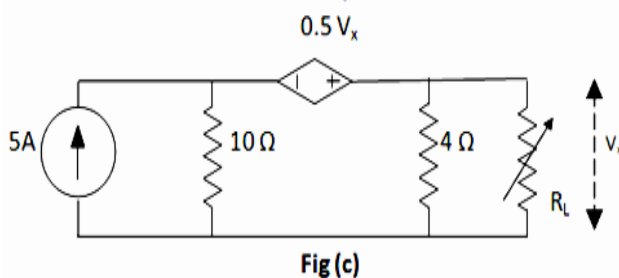
2. A) Calculate value of R_L for fig (c) getting maximum power. Also calculate Maximum Power. (10)

B) The network in fig (d) has acquired steady state before switching at $t = 0$.

i) Obtain $v_c(0^+)$, $v_c(0^-)$, $i(0^+)$ and $i(0^-)$

ii) Obtain time constant for $t > 0$ iii) Find current $i(t)$ for $t > 0$

(10)



3. A) The circuit given in fig (e) is in steady state with S_1 closed and S_2 open. At $t = 0$, S_1 is opened and S_2 is closed. Find current through the capacitor. (10)

B) Find Y –parameters for the network shown in fig (f). (10)

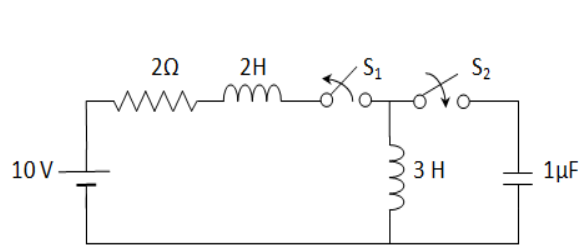


Fig (e)

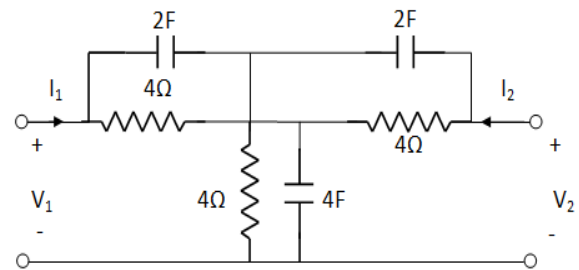


Fig (f)

4. A) For given network and pole zero diagrams for driving-point impedance $Z(s)$ are shown below.

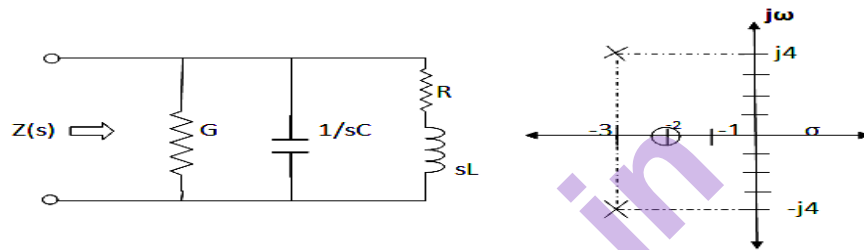


Fig (g)

Calculate the value of R,L, G and C if $Z(j0) = 1$. (10)

B) Find Voltage across 5 ohms resistor using Mesh analysis. (10)

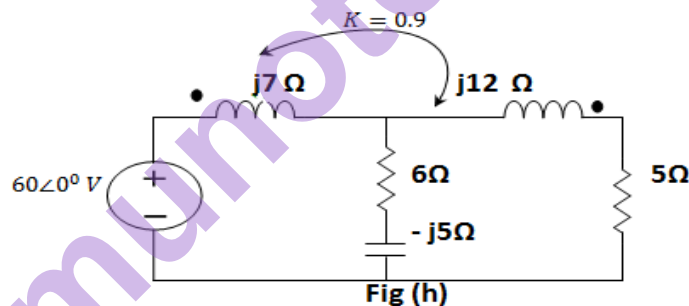


Fig (h)

5. A) For the given network, mention tieset matrix and obtain the network equilibrium equations in matrix form using KVL. (10)

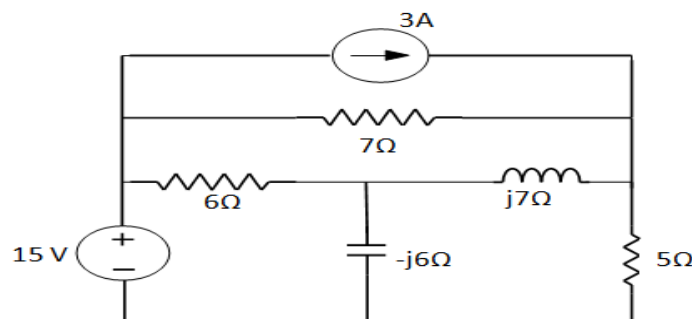


Fig (i)

B) At $t = 0$, unit pulse voltage of unit width is applied to a series RL circuit as shown in fig (j). Obtain an expression for $i(t)$. (6)

C) Draw dual of the network shown in fig (k).

(4)

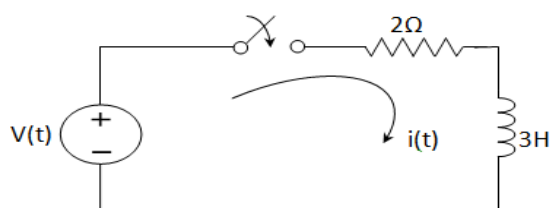


Fig (j)

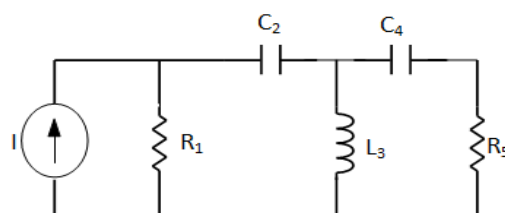


Fig (k)

6. A) Using superposition theorem, find current 'I' through circuit shown in fig (l).

(6)

B) In the given fig (m), at $t = 0$ switch is opened. Calculate v , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$.

(8)

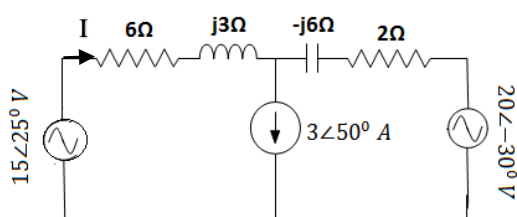


Fig (l)

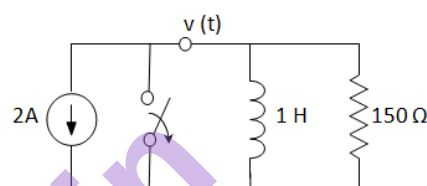


Fig (m)

C) The current $I(s)$ in a network is given by:

(6)

$$I(s) = \frac{4s}{(s+2)(s+4)}$$

Plot pole-Zero pattern in the S-plane and obtain $i(t)$.
