Duration: 3hrs   **[Max Marks: 80]**

N.B.: **(1) Question No 1 is Compulsory.**

(2) Attempt any three questions out of the remaining five.

(3) All questions carry equal marks.

**(4) Assume suitable data, if required and state it clearly.**

1   Attempt any **Four.**   **[20]**

a   Find ABCD parameters in terms of h parameters   **[5]**

b   Define Positive Real Functions & list the Properties of Positive Real Functions   **[5]**

c   State the properties of a LC function   **[5]**

d   Define Low-pass filter, High-pass Filter, Band-pass Filter & Band-stop Filter   **[5]**

e   Explain Kirchhoff's Current Law (KCL) & Kirchhoff's Voltage Law (KVL) with   **[5]**
      the help of suitable diagram

2 **a**   In the network shown in figure the switch is opened at t = 0 .Steady state   **[10]**
      condition is achieved before t = 0. Find i(t)
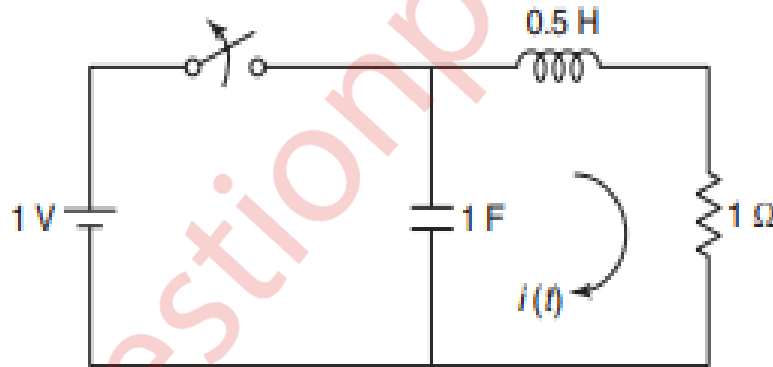
b   Find the open-circuit impedance parameters for the network shown in Figure.   **[10]**
   Determine whether the network is symmetrical and reciprocal

X237Y5512CAX237Y5512CAX237Y5512CAX237Y5512CA
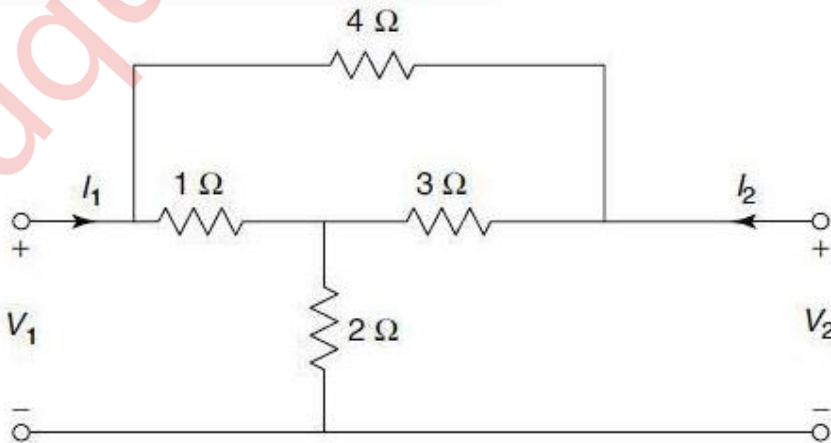
3 **a** For the network shown in figure, find all mesh currents & current through 8Ω **[10]**
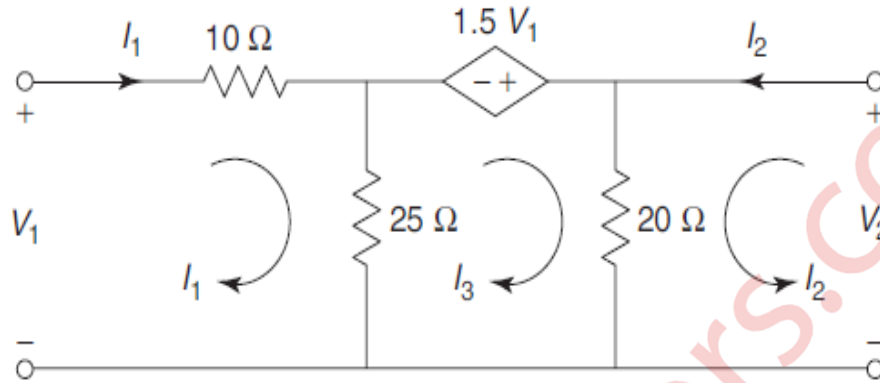resistor
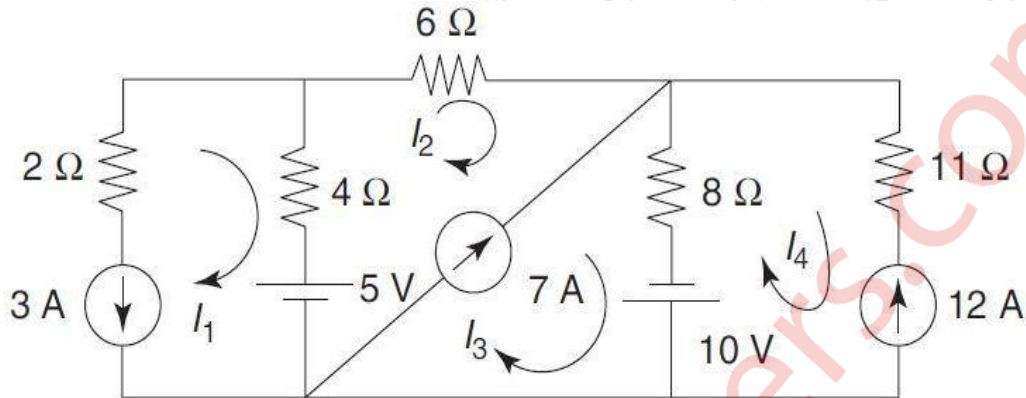
   b Realize Foster I and Foster II form for the following function **[10]**
$Z(S) = (s^2+1)(s^2+3) / s(s^2+2)$

4 **a** A high-pass filter section is constructed from two capacitors of 1 µF each and a 15 mH **[10]**
inductance. Find (a) cut-off frequency, (b) infinite frequency characteristic impedance,
(c) characteristic impedance at 200 Hz and 2000 Hz, (d) attenuation at 200 Hz and 2000
Hz, and (e) phase constant at 200 Hz and 2000 Hz

   b The switch in the network is closed at t = 0, find $V_2(t)$ for all t > 0. Assume zero **[10]**
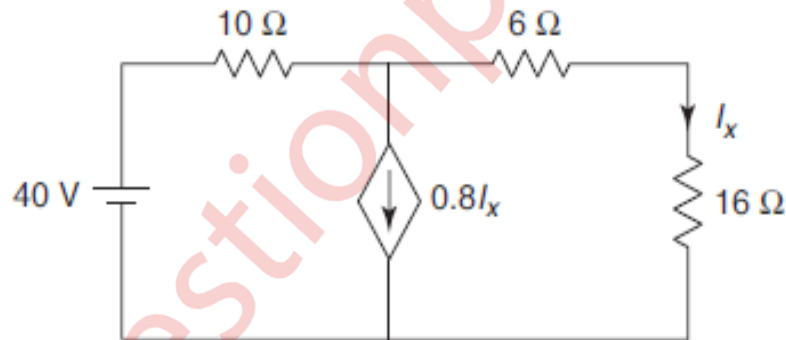initial current in the inductor
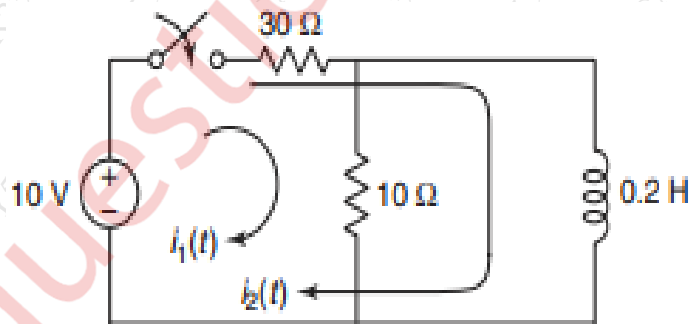
5 a Find the transmission parameters for the two port network shown below **[10]**

b State the properties of Hurwitz Polynomial and test whether the given polynomial is Hurwitz or not? **[10]**
$P(S) = s^7+2s^6+2s^5+s^4+4s^3+8s^2+8s+4$

6 a Determine the current flowing through a 16 Ω resistor using Thevenins Theorem **[10]**

b Test whether given function is positive real or not **[10]**
$F(S) = (s^3+6s^2+7s+3) / (s^2+2s+1)$

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