(3 Hours) [Total Marks : 80

N. B. : (1) Question **1** is **compulsory**.

(2) Solve any **three** questions from remaining five questions.

(3) **Figures** to the **right** indicate **full** marks.

(4) Assume suitable data if necessary.

1. Attempt the following

   (a) Find the condition of symmetry for Z parameters.

   (b) Define pole and zero of network function and draw p-z plot for

   $$V(s) = \frac{4(s+2)}{(s+3)(s^2+4s+5)}$$

   (c) Derive the s-domain equivalent for inductor with initial current Io and capacitor with initial voltage V_0.

   (d) Define and differentiate with suitable example
      (i) tree and cotree
      (ii) graph and oriented graph.

2. (a) For the given network draw an oriented graph and write f-cutset and f-tieset matrix.   10
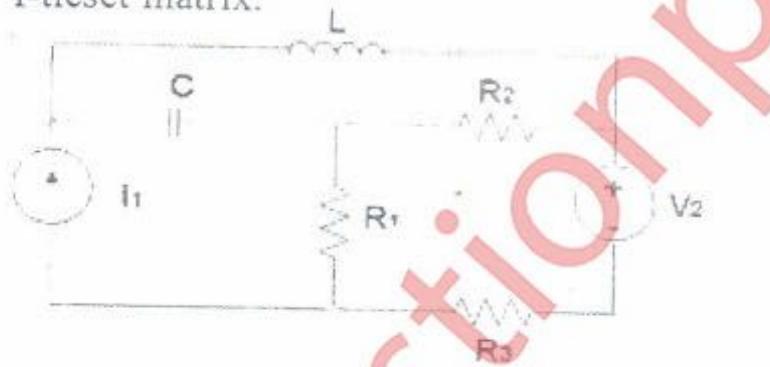
   (b) What will be the value of R_L to get maximum power delivered to it.   10
   What is value of this power.
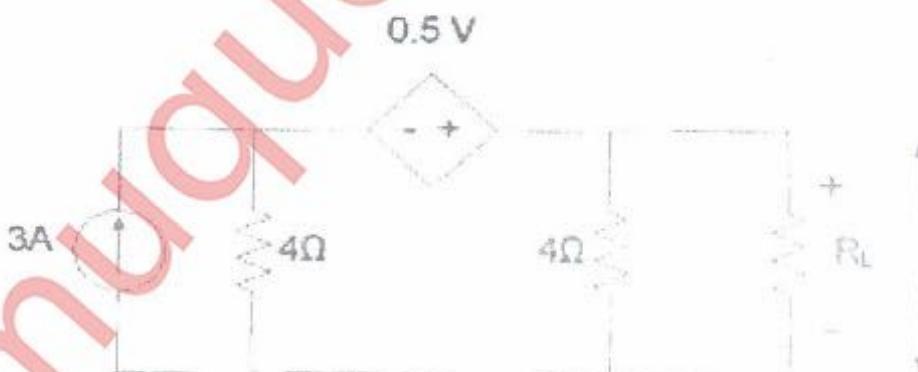
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3. (a) In the given circuit switch is opened at t = 0. Find the value of   10
   $v, \dfrac{dv}{dt}, \dfrac{d^2v}{dt^2}$ at $t = 0^+$.
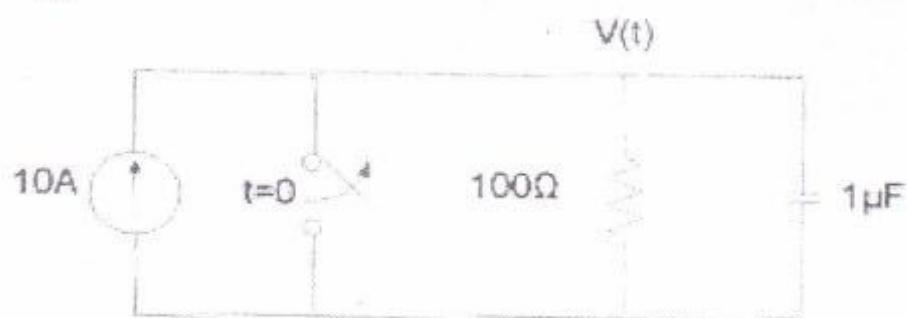
   (b) Find i(t) and Vc(t) for t > 0 using Laplace transform.   10

4. (a) Find A, B, C, D parameters for the network   10
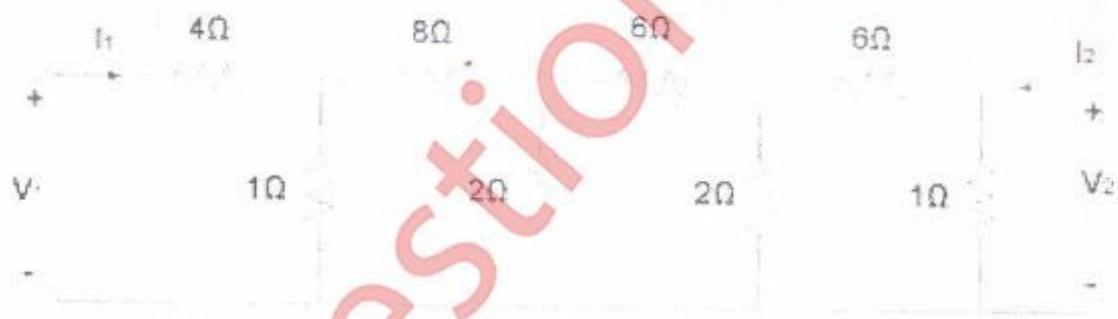
   (b) Find the driving point admittance Y_{11} and transfer admittance Y_{12} 10
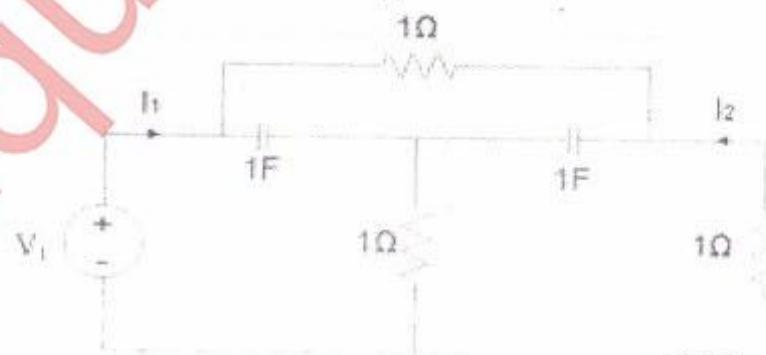
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5. (a) A series RLC circuit has a scale factor 5 for its driving point admittance **10** and the p-z plot of the same as shown below. Find the values of R, L, C
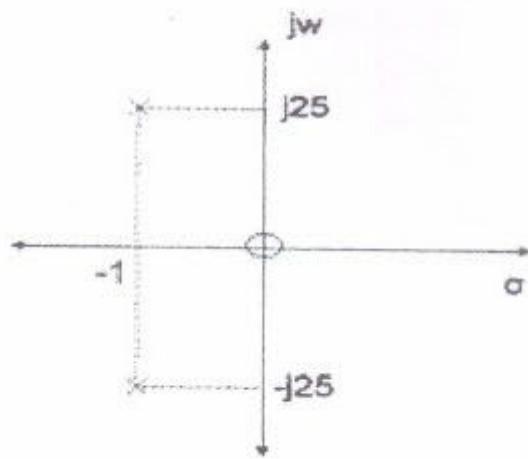
(b) Determine Cauer I and Cauer II fonn of realization of the function **10**

$$Z(s) = \frac{s(s^2 + 2)(s^2 + 5)}{(s^2 + 1)(s^2 + 3)}$$

6. (a) Write the mesh equation for the circuit. Find Y and Z parameters. **10**
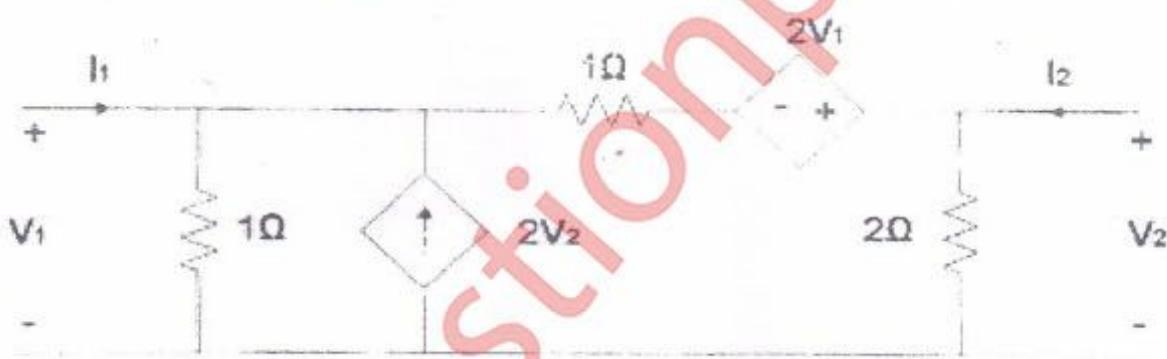
(b) Find the Norton's equivalent across A-B in the figure shown. **5**
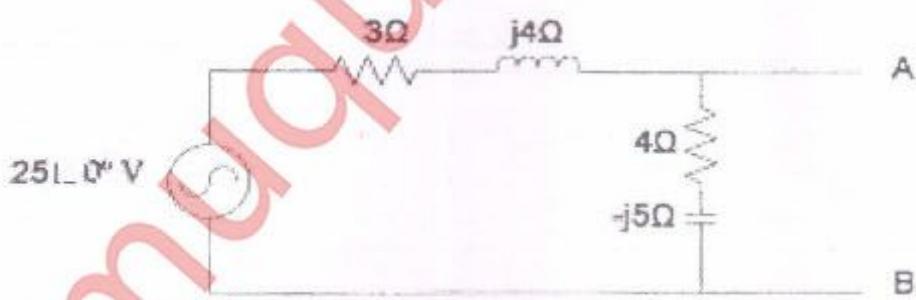
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(c) Write the mesh equations for circuit 5

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