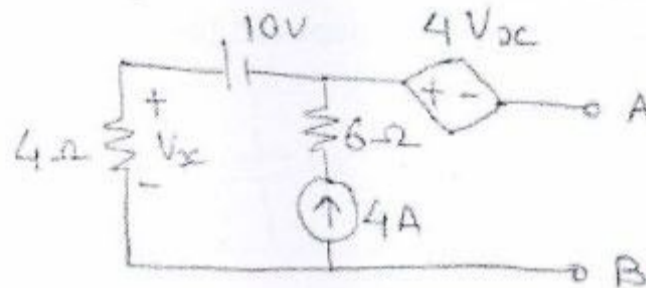**Q.P. Code: 26071**

[3 Hours] [Total Marks: 80]

NB. Q.1 is Compulsory.
Solve any three questions from the remaining
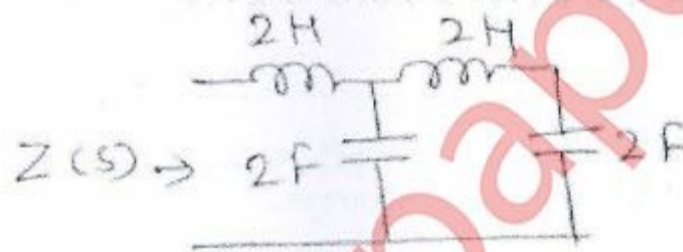Assume suitable data if required and justify it.

Q.1 Attempt any four 20

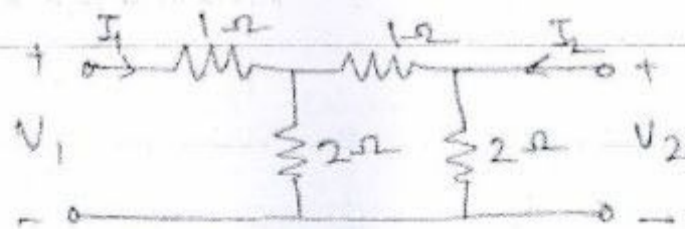a) Determine Thevenin's equivalent circuit for the given circuit

b) Determine driving point impedance function

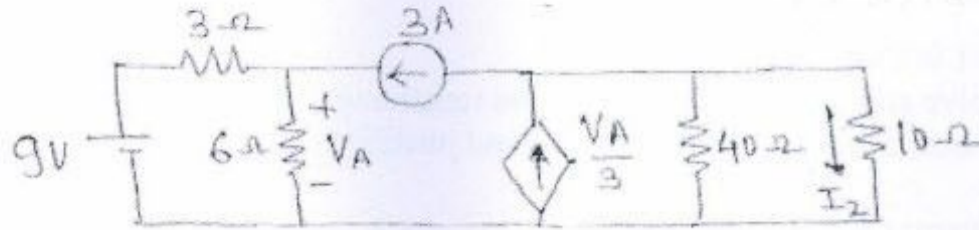c) Find i(t) when switch is moved from position 1 to 2 at t =0
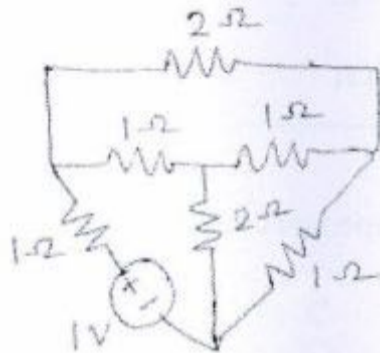

d) Find Z parameters for the shown network

e) Determine the range of values of 'a' so that
$$P(s) = s^4 + s^3 + as^2 + 2s + 3 \quad \text{is Hurwitz}$$

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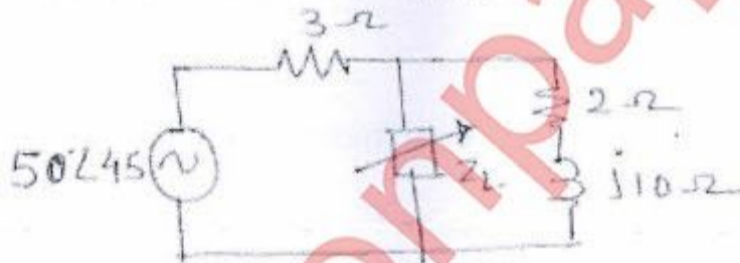Q.2   a) Find I_2 using superposition theorem   10
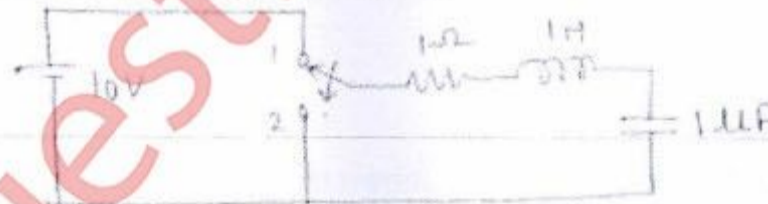

b) For the shown circuit, draw the graph and find: 10
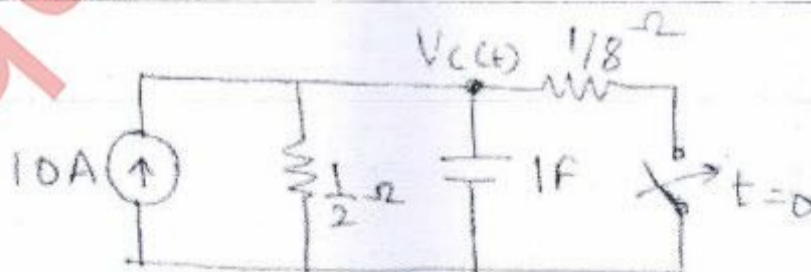   I.   Incidence matrix
    II.   f-cutset matrix

Q.3   a) Find the value of load impedance Z_L so that maximum power can be   10
           transferred. Calculate maximum power.
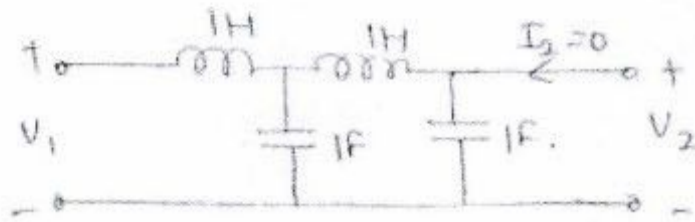

b) For the network, switch is moved from position 1 to 2 at t=0;   10
    Find i, di/dt, d^2i/dt^2, d^3i/dt^3 at $t=0^+$
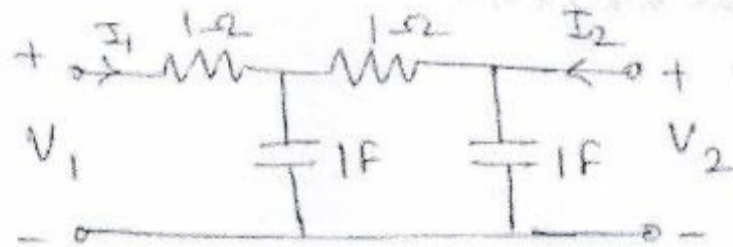

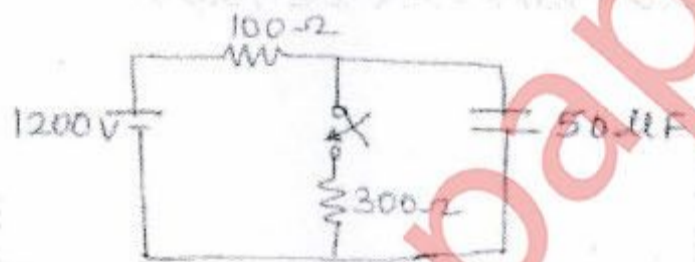Q.4   a) Find Vc(t).   10

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b) Obtain network function V_1/I_1, V_2/V_1 & V_2/I_1 for the network shown   **10**

Q.5   a) Determine Y- parameters   **10**

b) For the network, switch is open for long time at closes at t=0.   **10**
Determine Vc(t)

Q.6   a) Test for positive realness   **10**

       i) $Z(S) = \dfrac{S^2 + 2S + 25}{S + 4}$

       ii) $Z(S) = \dfrac{3S^2 + 5}{S(S^2 + 1)}$

b) Synthesize the given function using Cauer-I and Cauer-II forms   **10**

$$Z(S) = \frac{(S+1)\,(S+3)}{S(S+2)}$$

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