04/06/2025 SE ELECTRICAL SEM-III C-SCHEME ECA QP CODE: 10086897

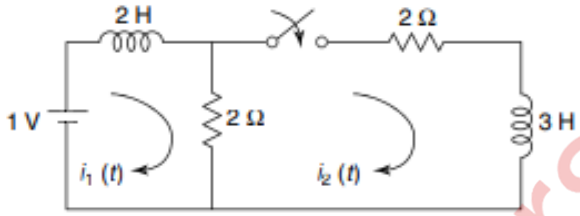
Time: 3 Hrs **Marks: 80**

Note:

- Question No. 1 is compulsory.
- Answer any **three** from the remaining five questions.
- Assume suitable data if necessary and justify the same.

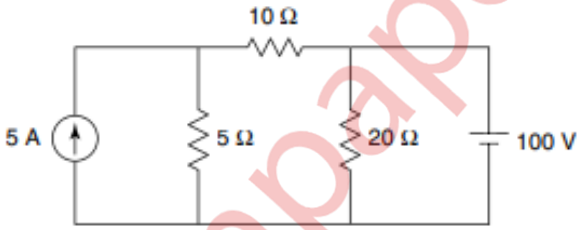
Q1 Each question carries five marks 20M

a In the given network, assuming all initial conditions as zero, find i_1, i_2 at $t=0+$.



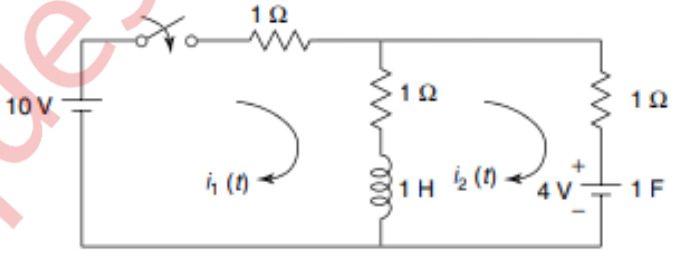
b Derive the condition for reciprocity and symmetry for ABCD-parameters.

c Determine the current through the 20 ohm in the following circuit

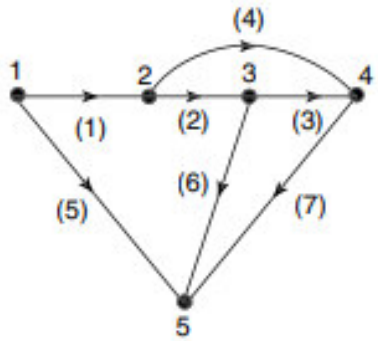


d Obtain the pole-zero plot of the function $F(s)=\frac{s(s+6)}{(s+1)(s+5)}$

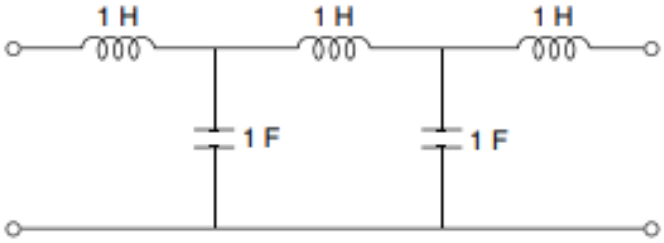
Q2 a For the network shown, the switch is closed at t = 0. Find the currents $i_1(t)$ and $i_2(t)$, when initial current through the inductor is zero and initial voltage on the capacitor is 4V, using Laplace Transform. 10M



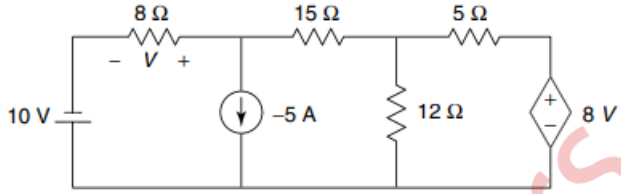
b For the given graph, write the incidence matrix, tieset matrix and f-cutset matrix. 10M



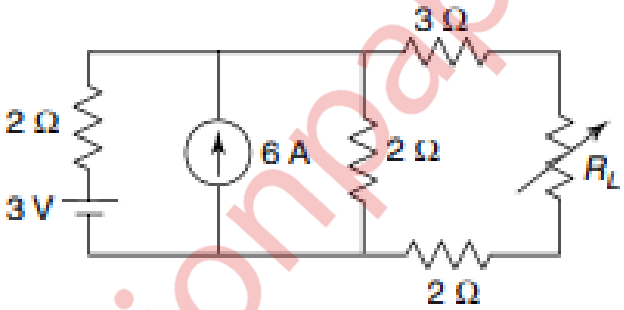
Q3 a Determine the transmission parameters of the network shown using the concept of interconnection of two two-port networks. 10M



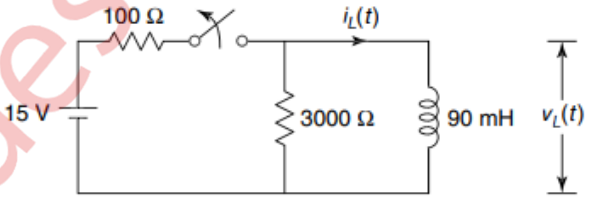
b Find the voltage V using superposition theorem. 10M



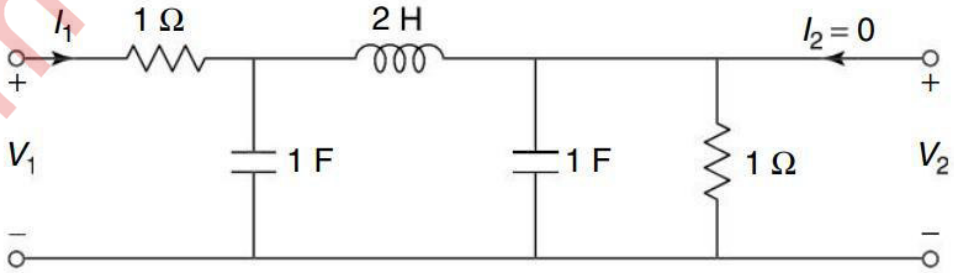
Q4 a Find the value of the resistance R_L for maximum power transfer and calculate the maximum power. 10M



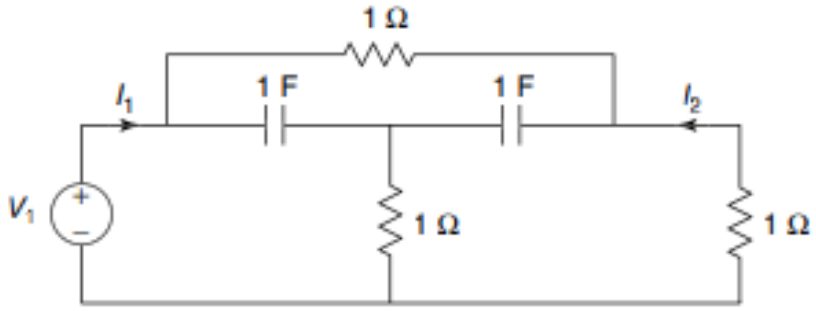
b For the following network, steady state is reached with the switch closed. The switch is opened at t = 0. Obtain expressions for i_L (t) and v_L (t). 10M



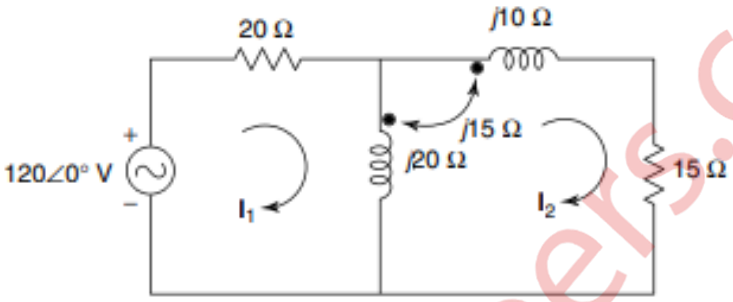
Q5 a For the given ladder network, determine the voltage transfer function V 2 /V 1. 10M



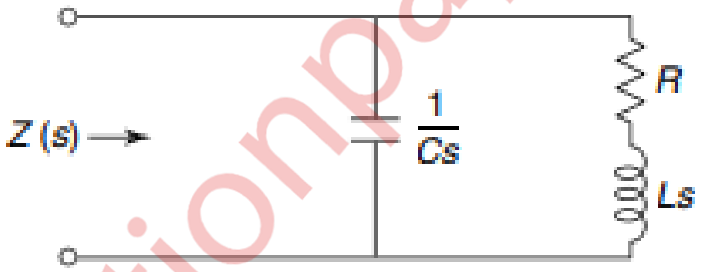
b For the given network, find the driving-point admittance Y_{11} and transfer admittance Y_{12} 10M



Q6 a Determine the voltage across the 15Ω resistor using mesh analysis. 10M



b For the given network, poles and zeros of driving point function Z(s) are, poles: (–1 ± j4); zero: –2. If Z (j0) = 1, find the values of R, L and C. 10M



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