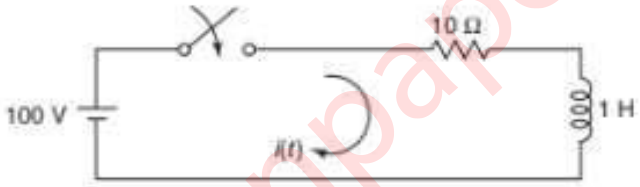
Duration: 3hrs **[Max Marks: 80]**

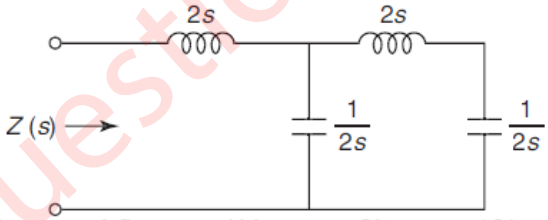
N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1. All the questions are compulsory

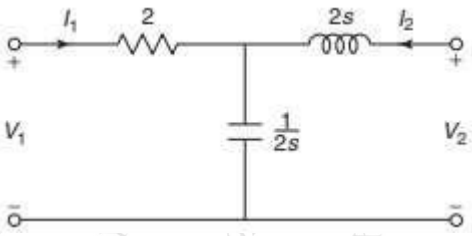
1. The combined inductance of two coils connected in series is 0.6 H or 0.1 H depending on relative directions of currents in the two coils. If one of the coils has a self-inductance of 0.2 H, find (a) mutual inductance, and (b) coefficient of coupling. **(5 Marks)**
2. In the network shown the switch is closed at t=0. With the capacitor uncharged, find the values of i , $\frac{di}{dt}$ at $t=0^+$ **(5 Marks)**



3. Draw the pole zero plot for Z(s) **(5 Marks)**



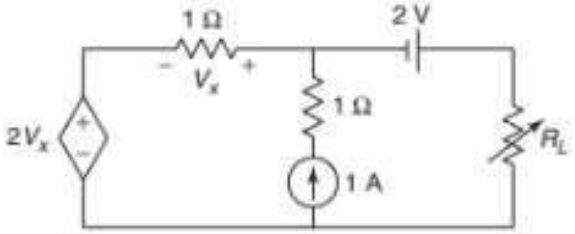
4. Find the ABCD parameters for the network shown **(5 Marks)**



5. Test whether the polynomial $P(s) = S^6+3S^5+8S^4+15S^3+17S^2+12S+4$ is Hurwitz. **(5 Marks)**

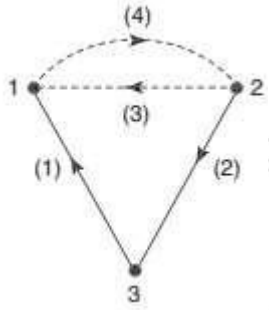
Q2. Solve the following

1. Find the value of R_L for maximum power transfer theorem **(10 Marks)**



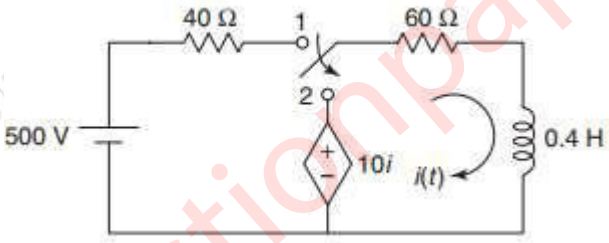
X525YEB9257X525YEB9257X525YEB9257X525YEB9257

2. Write incidence matrix, tieset matrix and cutset matrix **(10 Marks)**

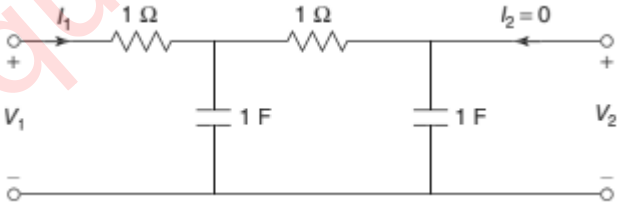


Q3. Solve the following

1. Find the current i(t) when the switch is changed from the position 1 to 2 at t = 0. **(10 Marks)**



2. Determine the value of V2/I1 **(10 Marks)**

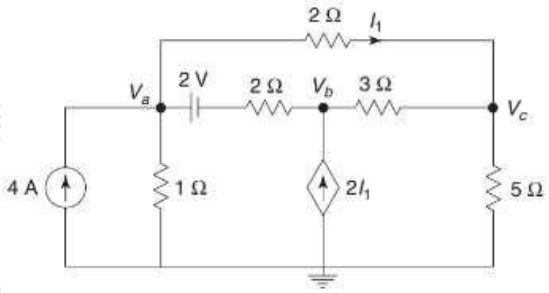


Q4. Solve the following

1. Realize the following function in Foster-I and Foster-II forms. **(10 Marks)**

$$Z(s) = \frac{(S+1)(S+3)}{S(S+2)(S+4)}$$

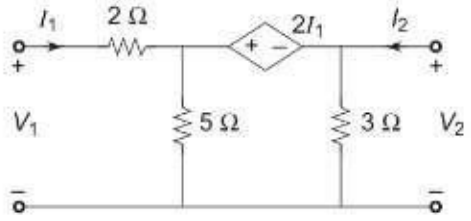
2. Find the node voltages in the network shown **(10 Marks)**



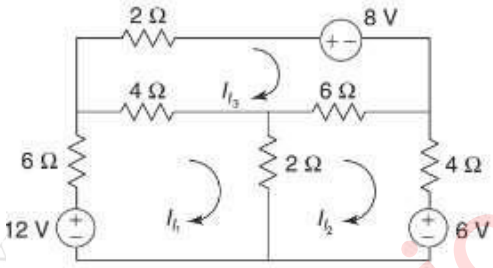
X525YEB9257X525YEB9257X525YEB9257X525YEB9257

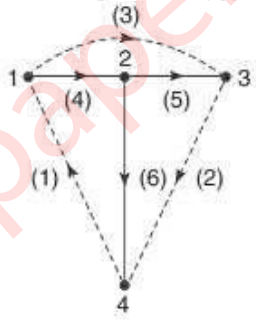
Q5. Solve the following

1. Obtain the ABCD parameters of the following network, State whether its reciprocal and symmetrical or not **(10 Marks)**



2. Obtain equilibrium equation using KVL in matrix form for the network and its graph shown here. Hence, find link currents. **(10 Marks)**

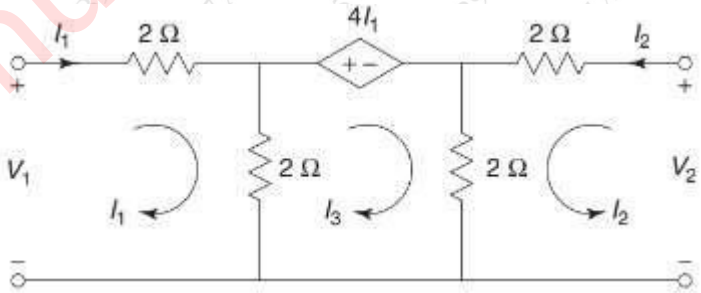




Q6. Solve the following

1. Test whether F(S) = $\frac{2S^3+2S^2+3S+2}{S^2+1}$ is positive real function. **(10 Marks)**

2. Find Z and h-parameters for the network shown **(10 Marks)**



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X525YEB9257X525YEB9257X525YEB9257X525YEB9257