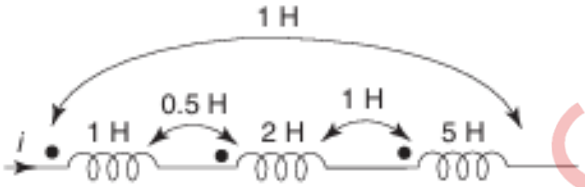
20 NOV 2025 SE EXTC (SEM-III) C SCHEME NT QP CODE: 10094809

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

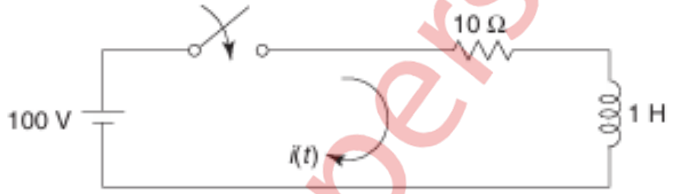
N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1. Attempt any four

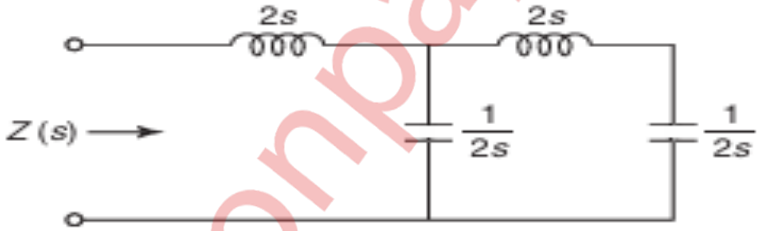
1. Find the equivalent inductance of the network shown. (5 Marks)



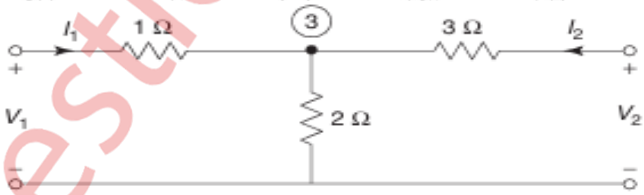
2. In the network shown the switch is closed at t=0. With zero current in the inductor, find the values of i , $\frac{di}{dt}$ at t=0^+ (5 Marks)



3. Determine the driving-point impedance of the network (5 Marks)



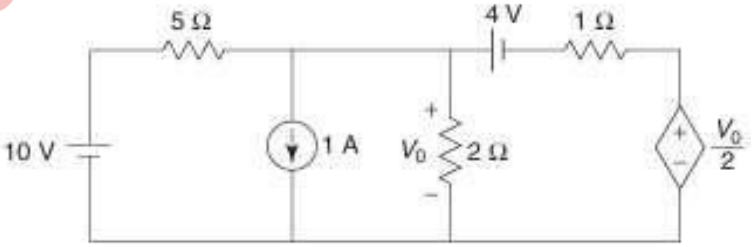
4. Find the Y parameters for the network shown (5 Marks)



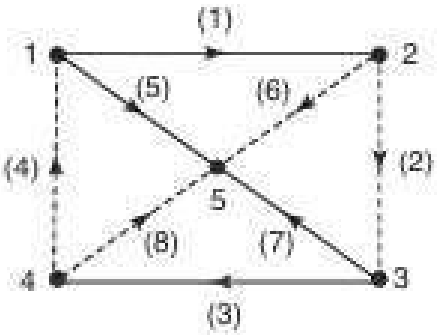
5. Test whether the polynomial P(s) = $S^4+S^3+3S^2+2S+12$ is Hurwitz. (5 Marks)

Q2. Solve the following

1. Find the voltage V0 in the network (10 Marks)

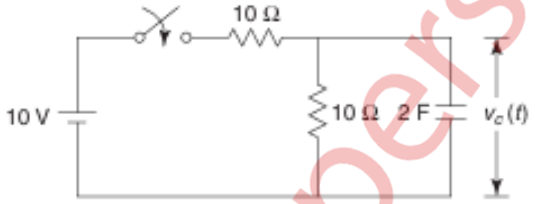


2. Write incidence matrix, tieset matrix and cutset matrix (10 Marks)

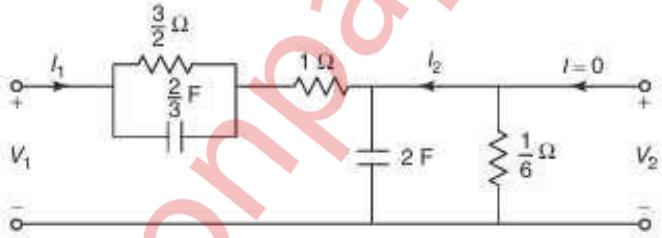


Q3. Solve the following

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 values of V2/I1 and V2/V1 (10 Marks)

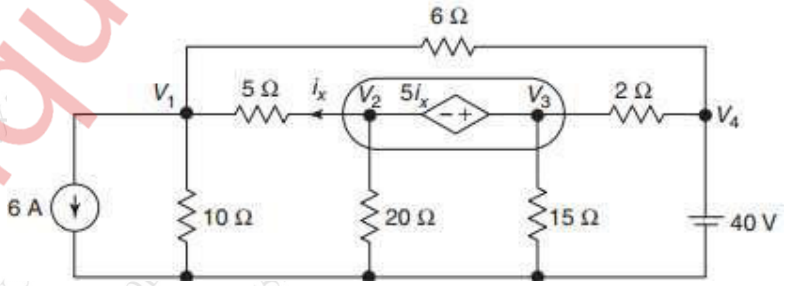


Q4. Solve the following

1. Realize the following function in Foster-I form. (10 Marks)

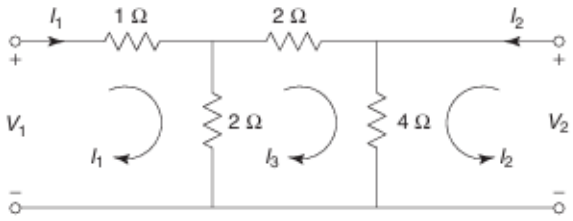
$$Z(s) = \frac{(S+1)(S+4)}{(S+5)(S+3)}$$

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

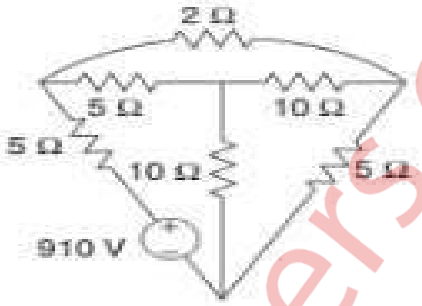


Q5. Solve the following

1. Determine hybrid parameters for the network. Determine whether the network is reciprocal. (10 Marks)

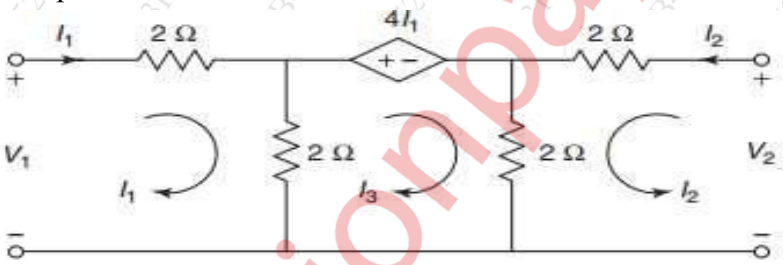


2. Calculate the twig voltages using KCL equation for the network shown. (10 Marks)



Q6. Solve the following

1. Test whether $F(S) = \frac{S^3+6S^2+7S+3}{S^2+2S+1}$ is positive real function. (10 Marks)
2. Find Z and h-parameters for the network shown (10 Marks)



****