K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ELE	Pattern:2022
Name of Course:Electrical Network Analysis	Course Code:ELE222011
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 03 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

1 Solve any one. (6) CO1

a) State and explain Maximum power Transfer Theorem.

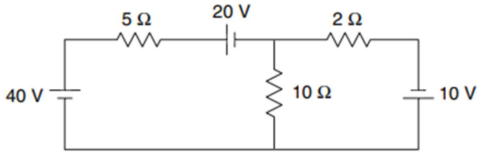
OR

b) Explain the concept of 1) Supermesh and 2) Supernode.

Question No. 2 Attempt following Question

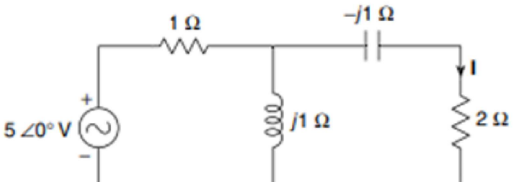
2 Solve any one. (6) CO2

a) Find the current through the 2 Ohm resistor using Thevenin's Theorem.



OR

b) Find the current through the 2 Ω resistor and verify the Reciprocity theorem.

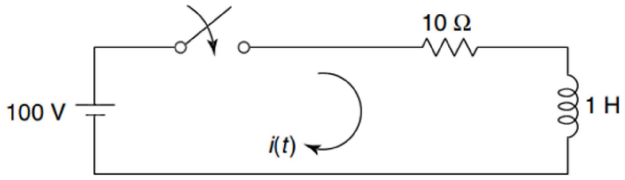


Question No. 3 Attempt following Question

3a) Obtain the expression for current through inductor in series RL circuit connected to a. d. c. voltage V for t >0 using the Laplace transform. Assume initial current through inductor is zero. (8) CO3

OR

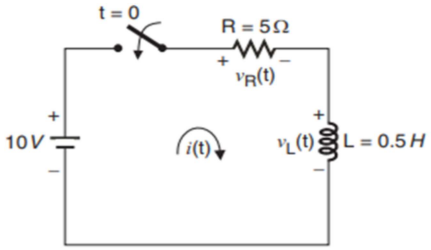
3b) In the figure, the switch is closed at t = 0. With zero current in the inductor, obtain the values of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$. (8) CO3



3c) Obtain the expression for voltage across capacitor in series RC circuit connected to a. d. c. voltage V for t >0. Assume initial charge across capacitor is zero using Laplace transform. (8) CO4

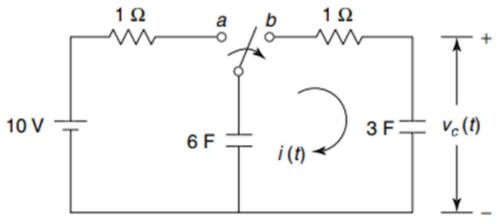
OR

3d) In the RL circuit of figure, the switch is closed at t = 0. Find the current i(t) through the inductance for t >0 using Laplace Transform. (8) CO4



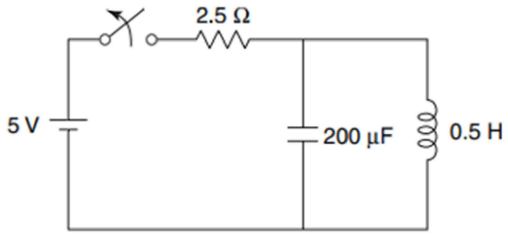
Question No. 4 Attempt following Question

4a) In the network of figure, the switch is moved from a to b at t = 0. Steady state being achieved at position a, determine i(t). (8) CO3



OR

4b) In the network of figure, the switch is closed and steady-state is attained. At t = 0, switch is opened. Determine the current i(t) through the inductor. (8) CO3



4c) What is high pass filter? Derive the expression for the cut-off frequency of prototype high pass filter in terms of L and C (8) CO4

OR

4d) What is filter? Explain the following in relation with filters :(i) stop band (ii) pass band (iii) cut-off frequency. (8) CO4

Question No. 5 Attempt following Question

5a) What are open circuit parameters? Derive interrelation between 'Z' and transmission parameters. (8) CO5

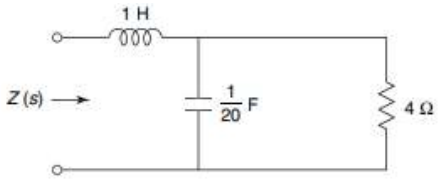
OR

5b) Define :i) Poles of system function. (8) CO5

ii) Zeros of system function and hence obtain the pole-zero plot of the following function.

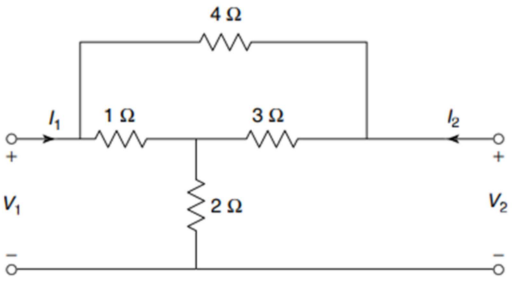
$$F(s) = \frac{(s+1)^2(s+5)}{(s+2)(s+3+j2)(s+3-j2)}$$

5c) Determine Z(s) in the network shown in figure and find poles and zeros of Z(s) and plot them on s-plane. (8) CO5



OR

5d) Find the open-circuit impedance parameters for the network shown in figure. (8) CO5



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