Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester I - 2023
Course Code : EEE2002
Course Name : Electric circuit Analysis
Program : B.Tech.

Date : 18-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **5 X 2M = 10M**

1. Resistance is the property of a substance due to which it opposes the flow of electric current through it. Define 1 ohm.

(CO1) [Knowledge]

2. This theorem deals with transfer of maximum power from a source to load. Name the theorem and also, provide the statement of the theorem.

(CO2) [Knowledge]

3. Write the network equations for current and voltage in frequency domain for resistive circuit.

(CO3) [Knowledge]

4. Write the Laplace transformation of:

1. Unit step function
2. Unit Impulse Function

(CO3) [Knowledge]

5. Define Norton's Theorem and Maximum Power Point Theorem.

(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5 X 10M = 50M**

6. Nodal analysis provides a general procedure for analyzing circuits using node voltages as the circuit variables. Choosing node voltages instead of element voltages as circuit variables is convenient and reduces the number of equations one must solve simultaneously. Estimate the power dissipated in 5Ω resistor in the circuit
(fig.3) given below.

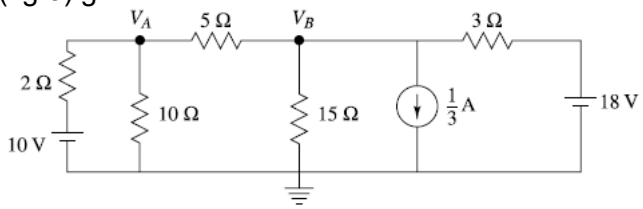


fig.3

(CO1) [Comprehension]

7. The network in the below figure has the switch is closed at t=0. Find the voltage and second derivative of the voltage at t=0+.

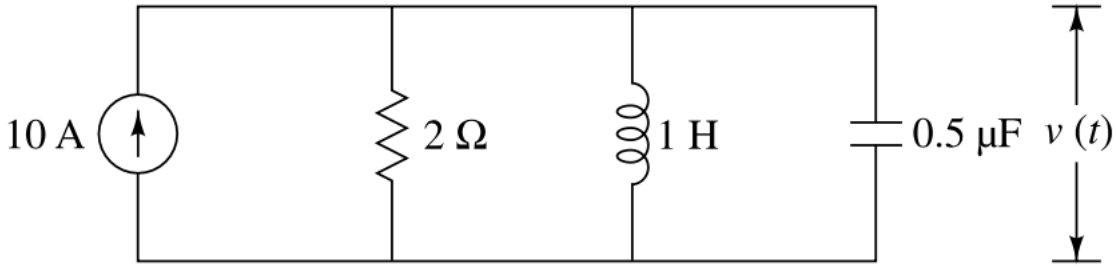


Figure: Network for initial condition

(CO2) [Comprehension]

8. In some applications, the purpose of a circuit is to provide maximum power to a load. Some examples are Stereo amplifiers, Radio transmitters, Communications equipment. Assume that you have the following system used in such examples; Comment on the value of load RL (fig.5) which should be connected to the system in order that the load receives the maximum power that the system can deliver.

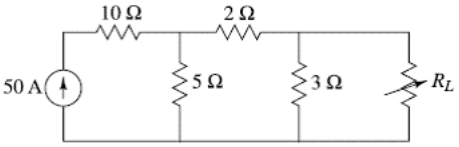


fig.5

(CO2) [Comprehension]

9. Voltage across the inductor is proportional to the rate of change of current. It is impossible to change the current through an inductor by a finite amount in zero time. This requires an infinite voltage across the inductor. An inductor does not allow an abrupt change in the current through it. For the circuit given in Figure d, Obtain the equation for circuit current i and its first derivative at t=0+ with respect to time.

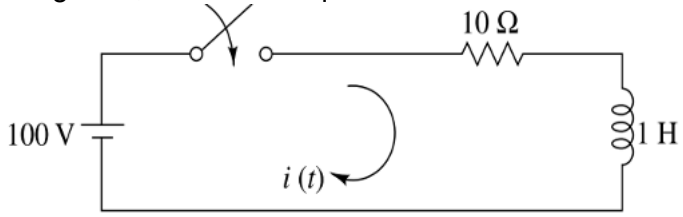


Figure d: Network for initial condition

(CO3) [Comprehension]

10. In the network of Figure given below, the switch is closed at t=0. With the capacitor uncharged, find the value for i, its 1st derivative and its 2nd derivative at t=0+.

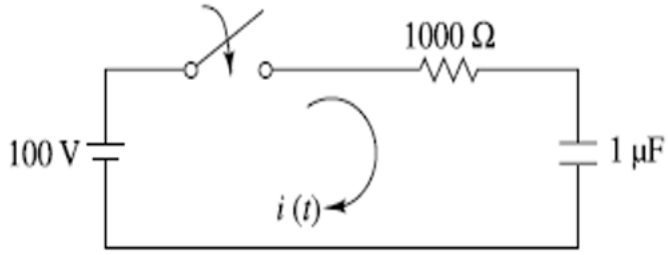


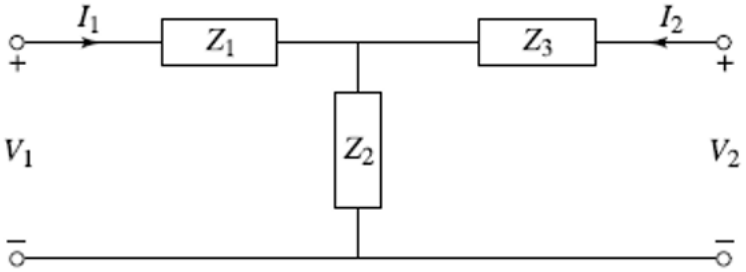
Figure i: The network with initial condition

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2 X 20M = 40M**

11. 1. As per the circuit given, identify the unknown parameters that could be obtained from the given data and compute the same. Assume that Z1= 1Ω, Z2=4Ω, Z3=6Ω.



(CO3) [Application]

12. Given a 3-phase star-connected induction motor with a per-phase impedance of (8+j10) ohms in the stator winding, and connected to a three-phase 440V, 50Hz supply. Assume the required data and compute the active, reactive power consumed in the load.

(CO4) [Application]