Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - FEB 2023

Semester : Semester I - 2022
Course Code : EEE2002
Course Name : Sem I - EEE2002 - Electric circuit Analysis
Program : B.Tech. Electrical and Electronics Engineering

Date : 23-FEB-2023
Time : 1.00PM - 4.00PM
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 **(10 X 2 = 20M)**

1. If the network contains B branches and N nodes then the no. of mesh currents are given by M =.....

(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 Laplace transformation of:
1. Unit step function
2. Unit Impulse Function

(CO3) [Knowledge]

4. The time taken to change from an initial steady state to the final steady state is known as the …… This response is known as …….

(CO3) [Knowledge]

5. Voltage–current relationships of network elements can also be represented in the frequency domain. Frequency domain analysis using Laplace transform is very convenient. The corresponding frequency domain elements of inductor and capacitor are .....and ..... respectively.

(CO1) [Knowledge]

6. Current through a capacitor is proportional to the rate of change of voltage. It is impossible to change the voltage across a capacitor by a finite amount in zero time. If there is no voltage across the capacitor at t = 0– , then at t = 0+, the voltage across the capacitor will be _____

(CO1) [Knowledge]

7. Transmission and distribution of a three-phase system is cheaper than that of a single-phase system. State the reason.

(CO2) [Knowledge]

8. In a delta-connected load, the relation between line voltage and the phase voltage is ___?

(CO1) [Knowledge]

9. All Commercial energy throughout the world is **generated, transmitted** and **distributed** in the form of three phase energy. Why 3-phase systems are more popular?

(CO2) [Knowledge]

10. Voltage-current relationship for a capacitive circuit in time domain can be given by:
V(t)=....., I(t)=.....

(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(4 X 10 = 40M)**

11. RC circuits can be used to provide various time delays. The warning blinkers commonly found on road construction sites are one example of the usefulness of such an RC delay circuit. For the series RC circuit given in figure, the switch is closed at t=0, with inductor uncharged in prior. Comment on the behavior of capacitor given in Figure c immediately after closing the switch and obtain the value of second derivative of inductor current with respect to time at t=0+.

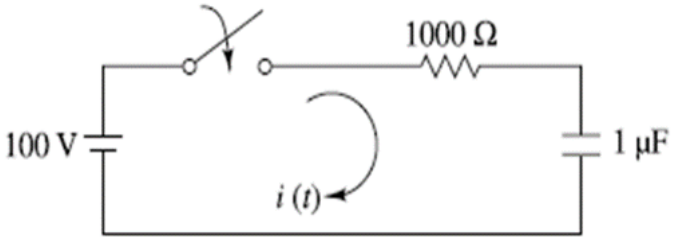

Figure c: Network for initial conditions

(CO3) [Comprehension]

12. In the network of Figure e given below, at t=0, the switch is opened. Calculate voltage and its second derivative at t=0+.

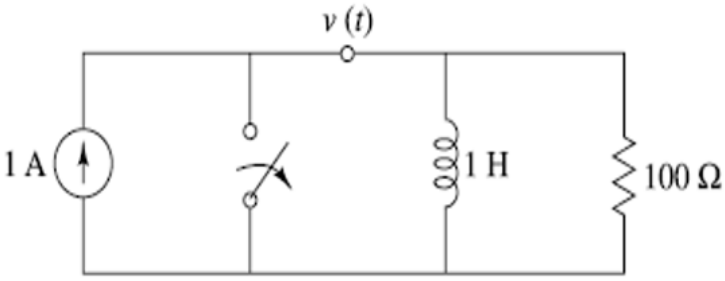

Figure e: Netwok for initial conditions.

(CO2) [Comprehension]

13. A three phase star connected induction motor is having per phase impedance of stator winding as (8+j10) ohms. It is connected to three phase 440V, 50Hz Supply. Assume the required data and compute the active, reactive power consumed in the load.

(CO4) [Comprehension]

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

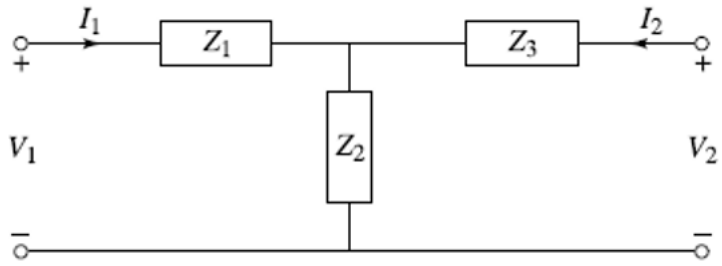

Figure g: Two port network

(CO5) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **(4 X 10 = 40M)**

15. Three equal impedances, each of 8=j10 ohms are connected in star. This is further connected to a 440V, 50 Hz, three phase supply. Calculate the active and reactive power and line and phase currents.

(CO2) [Application]

16. The switch in the network shown in Figure b. is closed at t = 0. Determine the voltage across the capacitor, Vc(t) for t > 0 using Laplace transforms.

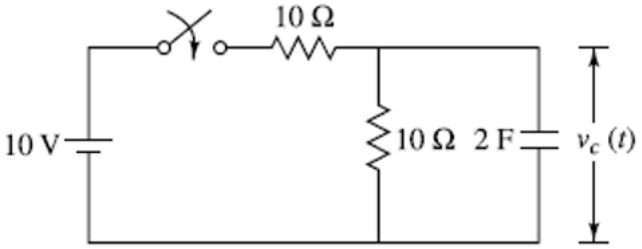

Figure b: Network for initial condition

(CO4) [Application]

17. In the network of Figure given below, the switch is closed. Assuming all initial conditions as zero, find the value for current and its second derivative at t=0+.

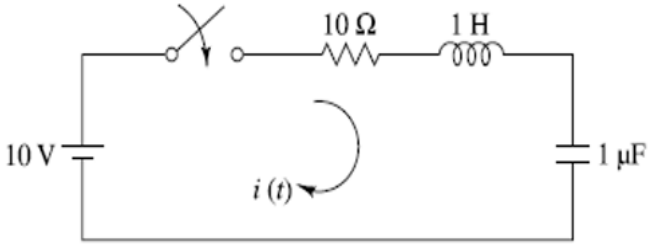

Figure ii: The network for initial conditions

(CO4) [Application]

18. For the network of Figure h given below, the switch is closed at t=0. Find the voltage and second derivative of the voltage at t=0+.

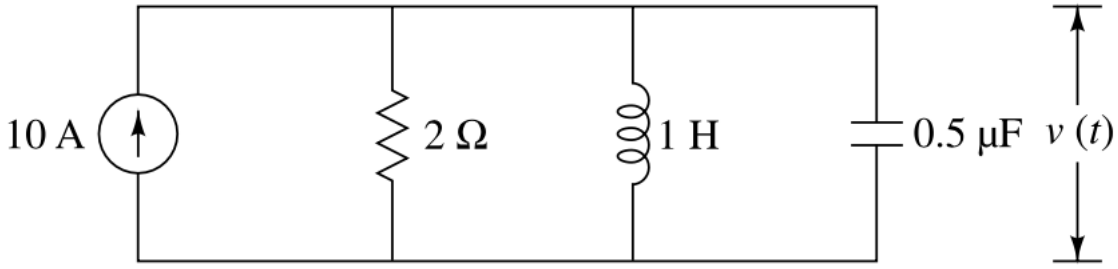

Figure h: Network for initial condition

(CO2) [Application]