Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - FEB 2023

Semester : Semester I - 2022
Course Code : ECE2004
Course Name : Sem I - ECE2004 - Network Theory
Program : B.Tech. Electronics and Communication 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 FIFTEEN QUESTIONS **15 X 2 = 30M**

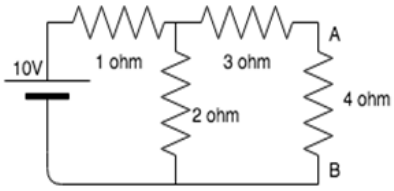
1. Voltage and current sources are the active elements in networks. They provide energy to the network elements. Sometimes it may be necessary to transform voltage sources into current sources and vice versa. Mr X is having a current source of 15 amperes with a shunt resistance of 100 ohms. Calculate the voltage?

(CO1,CO3,CO4,CO2) [Knowledge]

2. Find the voltage across a resistor of 1000 ohms through which a current of 50 amperes is flowing neglecting the effects of room temperature.

(CO1,CO2,CO3,CO4) [Knowledge]

3. Find the Thevenins resistance across the terminal AB for the following circuit.



(CO4,CO3,CO1,CO2) [Knowledge]

4. Once the circuit is transformed from current sorce to a voltage source where will the resistance be connected?

(CO1,CO4,CO2,CO3) [Knowledge]

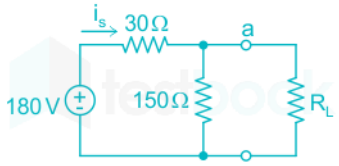
5. The expression of current in R-L circuit is?

(CO3,CO4,CO5,CO2,CO1) [Knowledge]

6. If a 6 ohm, 2ohm and 4ohm resistor is connected in delta, find the equivalent star connection.

(CO3,CO2,CO1,CO4) [Knowledge]

7. Determine the load resistor that will result in maximum power delivered to the load for the given circuit also determine the maximum power delivered to load resistor



(CO4,CO3,CO2,CO1) [Knowledge]

8. In determining open circuit impedance parameters, among V1, V2, I1, I2, which of the following are dependent variables?

(CO4,CO3,CO2,CO1) [Knowledge]

9. Star and Delta are the two basic types of three phase connection. . If i am having a balanced star connection of 50 ohm in each branch. Find the equivalent delta resistance.

(CO4,CO2,CO3,CO1) [Knowledge]

10. While computing the Thevenin equivalent resistance and the Thevenin equivalent voltage, Mention the steps undertaken?

(CO2,CO1,CO4,CO3) [Knowledge]

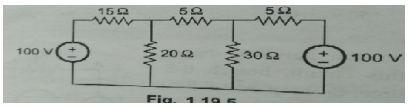
11. Resistivity of a wire depends on what all factors explain the same.

(CO1,CO4,CO2,CO3,CO5) [Knowledge]

12. Power transfer from source to load will be maximum when source resistance Rs is equal to load resistance RL. Prove the same using appropriate circuit diagram.

(CO5,CO3,CO2,CO1,CO4) [Knowledge]

13. For the circuit shown below find the current through 30 ohm resistor using mesh analysis



(CO4,CO1,CO2,CO3) [Knowledge]

14. A capacitor is an energy storing element. Calculate the energy saved in a capacitor of 5 micro farad when the voltage across it is 10 volts.

(CO3,CO1,CO2,CO4) [Knowledge]

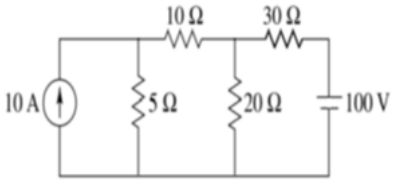
15. A project trainee is working with five voltage sources of 1v,2v,3v,4v and 5v with internal resistances of 1Ω, 2Ω, 3Ω, 4Ω and 5Ω respectively connected in parallel. Project trainee wants to have a single voltage source in series with a resistor. Help the trainee in this problem.

(CO1,CO2,CO3,CO4) [Knowledge]

PART B

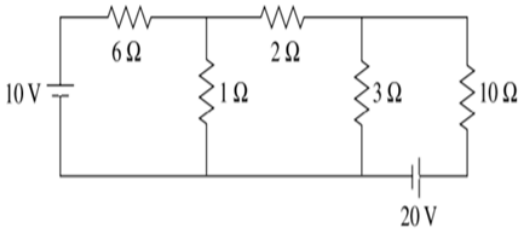
ANSWER ALL THE TWO QUESTIONS **2 X 15 = 30M**

16. In a network any resistor network can be converted into a single equivalent resistor.
a.State Thevenin's theorem with an example.
b.Compute the current passing through 10 ohm resistance using Thevenin's theorem in Fig given below.



(CO3,CO4) [Comprehension]

17. Mesh analysis is used to determine currents in a circuit loop by solving KVL equations for the voltages across each component in the loop. Calculate the current across 2Ω resistor using mesh analysis.



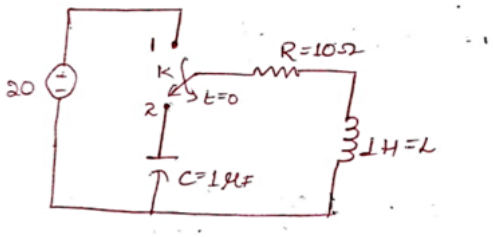
(CO3,CO4) [Comprehension]

PART C

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

18. a. Mr X is working on RL network in the laboratory. He experiences a change in the network when the switch is closed at t=0. To attain a steady state it requires certain time. He is interested in knowing the circuit behavior in transient state. Help him out by deriving an equation for transient behavior of this RL network.

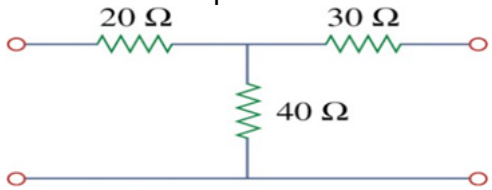
b.The switch "K" is changed from position 2 to position 1 at t=0 steady-state condition having been reached at position 1 find the value of i, di/dt , di2/dt2 at t=0+ .



(CO1,CO2,CO3,CO4) [Application]

19. a.Z parameter of two port network is a 2×2 impedance matrix. It is also known as the open circuit parameter. Derive the Z parameters of a two-port network..

b.Determine the Z parameters for the below given network



(CO4) [Application]

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