



**PRESIDENCY UNIVERSITY
BENGALURU**

SET B

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - DEC 2023**

Semester : Semester I - 2023

Course Code : ECE2004

Course Name : Sem I - ECE2004 - Network Theory

Program : B. TECH

Date : 11-DEC-2023

Time : 2:30 PM - 4:00 PM

Max Marks : 50

Weightage : 25%

Instructions:

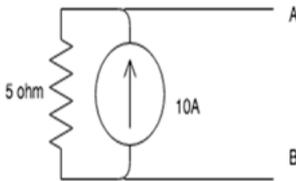
- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE FIVE QUESTIONS

5 X 2=10M

1. Calculate the value of voltage once source transformation is applied to the circuit.



(CO1) [Knowledge]

2. You have a three-phase electrical circuit with three resistors connected in a delta configuration (Δ -connection). The resistors have the following values
Resistance of each resistor (R_{Δ}) in the delta configuration = 8 ohms. Determine the equivalent resistance in the star (Y) configuration

(CO1) [Knowledge]

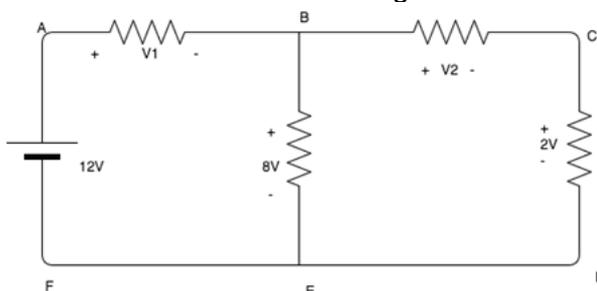
3. In practical world, no sources will be ideal, for the purpose of study we will assume the sources are ideal. Differentiate between ideal and practical voltage sources.

(CO1) [Knowledge]

4. Star and Delta are the two basic types of three phase connection. We know that star and delta can be transformed from one type of connection to other. If i am having a balanced star connection of 5 ohm in each branch. Calculate the equivalent delta resistance.

(CO1) [Knowledge]

5. Calculate the value of V_1 and V_2 using Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL)?



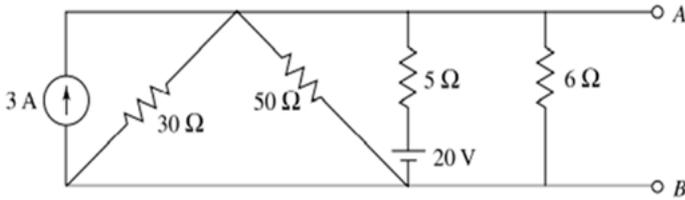
(CO1) [Knowledge]

PART B

ANSWER ALL THE TWO QUESTIONS

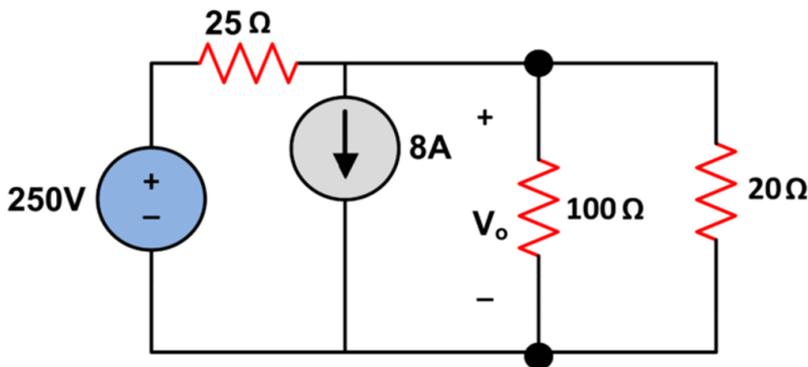
2 X 10 = 20M

6. A voltage source with a series resistance can be converted into an equivalent current source with a parallel resistance. Conversely, a current source with a parallel resistance can be converted into voltage source with a series resistance. Replace the circuit between A and B with a voltage source in series with a single resistor by using source Transformation Technique



(CO1) [Comprehension]

7. A voltage source with a series resistance can be converted into an equivalent current source with a parallel resistance. Conversely, a current source with a parallel resistance can be converted into voltage source with a series resistance. Find V_o using source Transformation Technique



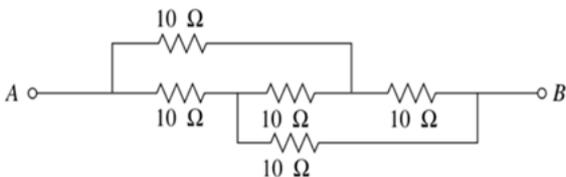
(CO1) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS

2 X 10 = 20M

8. The star-delta transformation, also known as the Y- Δ transformation, is a technique used in electrical engineering to simplify the analysis of complex resistor networks. This transformation allows you to convert a circuit with a star (Y) configuration into an equivalent delta (Δ) configuration, or vice versa Find the equivalent Resistance between the point A & B



(CO1) [Application]

9. A wheatstone bridge ABCD is arranged as follows AB is equals to 10 ohm BC is equal to 30 ohm and CD is equals to 15 ohm and DA is equals to 20 . A 2 volt battery of internal resistance 2 ohm is connected between points A and C with A being positive. A galvanometer of resistance 40 ohm is connected between B and D. Find the magnitude and direction of the Galvanometer current

(CO1) [Application]