

Code No: 113BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, September/October - 2023

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

## PART- A

(25 Marks)

- 1.a) What are the differences between independent and dependent sources? [2]
- b) State and explain the maximum power transfer theorem. [3]
- c) Define power factor of an a.c circuit. [2]
- d) The impedance of an electrical circuit is  $(30 - j50)$  ohms. Determine (i) the resistance, (ii) the capacitance, and (iii) the magnitude of the impedance, when the circuit is connected to a 240 V, 50 Hz supply. [3]
- e) Define transformation ratio of transformer. [2]
- f) What is the working principle of transformer? [3]
- g) What is the condition for maximum efficiency of a DC machine? [2]
- h) What are the different types of DC Generators? [3]
- i) Differentiate gravity and spring control mechanisms used in measuring instruments. [2]
- j) What are the advantages and limitations of MI type instruments. [3]

## PART- B

(50 Marks)

- 2.a) Using method of superposition, determine the current through the  $5k\Omega$  resistors for the circuit in Figure 1 .

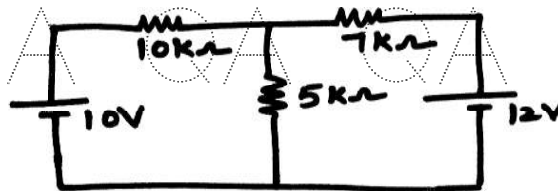


Figure: 1

- b) Explain the Kirchhoff's laws. [6+4]

OR

- 3.a) State and explain Thevenin's theorem.

- b) Determine the current  $I$  in the network shown in Figure 2 by using Thevenin's theorem. [3+7]

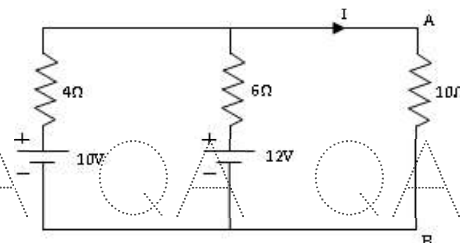


Figure: 2

4. An alternating voltage expressed as  $i = 14.14 \sin(314t + \phi)$   
Determine a) Time period                      b) Frequency  
                  c) rms value of current        d) Average value of current  
                  e) peak factor                              f) form factor                                      [10]

**OR**

5. A resistance of  $10\Omega$  connected in series with a  $50\text{mH}$  inductance across a  $230\text{V}$ ,  $50\text{Hz}$  supply.  
Find a) impedance        b) current    c) power factor  
          d) Phase angle    e) voltage across resistor and inductor                                      [10]

- 6.a) Describe how the open circuit test is conducted on the single phase transformer.                                      [7+3]  
b) Explain about transformer regulation.

**OR**

- 7.a) Explain about various losses of Single phase transformer? How to minimize them?  
b) State the various parts of a transformer and their function.                                      [6+4]

8. Explain the working principle of D.C. Motor with neat sketches.                                      [10]

**OR**

- 9.a) Three phase induction motor is wound for four poles and is supplied from  $50\text{Hz}$  supply. Calculate  
i) Synchronous speed  
ii) the speed of the rotor when the slip is  $3\%$  and  
iii) the rotor frequency when the speed of the rotor is  $900\text{rpm}$ .  
b) Enumerate the different types of losses in a DC motor?                                      [6+4]

- 10.a) Summarize the various effects utilized in different types of measuring Instruments.  
b) Explain the working Principle of repulsion type Moving Iron Instrument.                                      [5+5]

**OR**

- 11.a) Explain the working of Moving coil Permanent magnet instruments.  
b) What are the different damping mechanisms provided to the measuring instruments?  
Explain in brief.                                      [6+4]

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