

R18

Code No: 152AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE, ECM, CSBS, CSE (AI&ML), CSE (IOT), AI&DS, AI&ML)

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) Two resistors of $4\ \Omega$ and $6\ \Omega$ are connected in parallel. If the supply current is 30 A, find the current in each resistor. [2]
- b) What is the voltage across the $60\ \Omega$ resistance of the network shown in figure 1? [3]

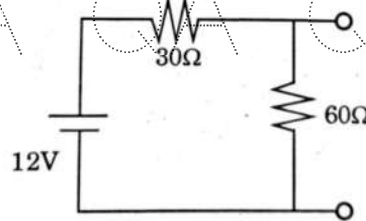


Figure 1

- c) Write down the relationship between line and phase voltages in a three-phase delta connection. [2]
- d) An alternating current of frequency 60 Hz has a maximum value of 120 A. Write down the equation for its instantaneous value and find the RMS value of the current. [3]
- e) Differentiate between core and shell-type transformers. [2]
- f) Define the voltage regulation of a transformer. [3]
- g) List the various methods of speed control of DC motor. [2]
- h) Define synchronous speed. [3]
- i) Write the functioning of MCB. [2]
- j) State the necessity of earthing. [3]

PART - B

(50 Marks)

2. Using Kirchoff's laws, find the mesh current in each loop for the given circuit. (Figure 2) [10]

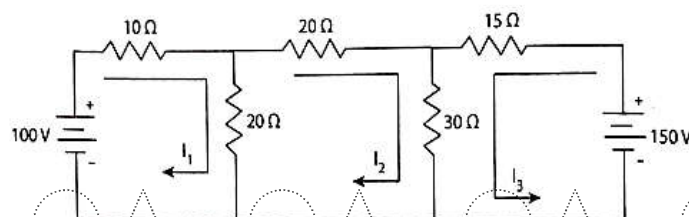


Figure 2

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OR

3. Using thevenin's equivalent circuit across 'A' and 'B' terminals, Calculate the current I_0 through the $2\ \Omega$ resistor in the given circuit. (Figure 3) [10]

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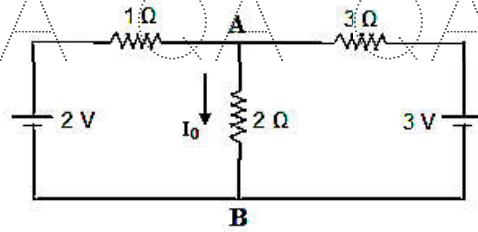
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**Figure 3**

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4. Find the circuit constants R and C in an RC series circuit that consumes 700 Watts with a 0.707 leading power factor. The applied voltage is $V = 141.4 \sin 314t$. [10]

OR

5. A resistance of $100\ \Omega$ is connected in series with a $50\ \mu\text{F}$ capacitor. When the supply voltage is 200 V, 50 Hz, Find (a) the impedance, current, and power factor. (b) voltage across resistor and capacitor. [10]

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6. Obtain the equivalent circuit of a single transformer referred to as primary and secondary. [10]

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7. Explain the working of auto transformer and prove that when the transformation ratio approaches unity, the amount of copper used approaches smaller value. [10]

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8. Discuss the construction and working principle of a single-phase Induction motor. [10]

OR

9. Explain the construction and working of synchronous generators. [10]

10. List out the types of batteries. Discuss the characteristics of a battery. [10]

OR

11. Discuss the different types of wires and cables used for electrical installations. [10]

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