

Code No: 152AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year II Semester Examinations, January/February - 2024

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.

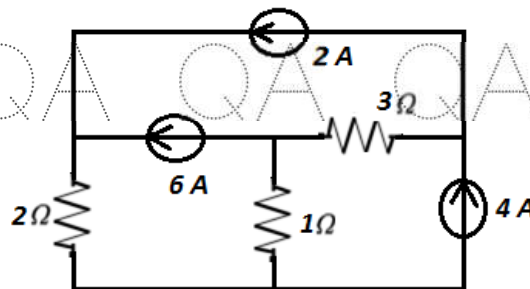
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A**(25 Marks)**

- 1.a) How voltage and current are related in an inductor? [2]
- b) What are the properties of a voltage source? [3]
- c) Define reactive power. [2]
- d) What is the relationship between line and phase voltages in delta connected three phase system? [3]
- e) What a transformer does? [2]
- f) How voltage and current change in step down transformer? [3]
- g) What is the slip of induction motor at starting? [2]
- h) What is the purpose of field winding in DC motor? [3]
- i) State various wires used in electrical installations. [2]
- j) What is battery backup? What is its application? [3]

PART - B**(50 Marks)**

- 2.a) Define KCL. Give an example that verifies KCL.
- b) Using superposition theorem, determine the current in $1\ \Omega$ in the circuit below figure 1. [5+5]

Figure 1
OR

- 3.a) Give the detailed time domain analysis of first order RL circuit.
 b) Using Norton's theorem, determine the current in $1\ \Omega$ in the circuit below figure 2. [5+5]

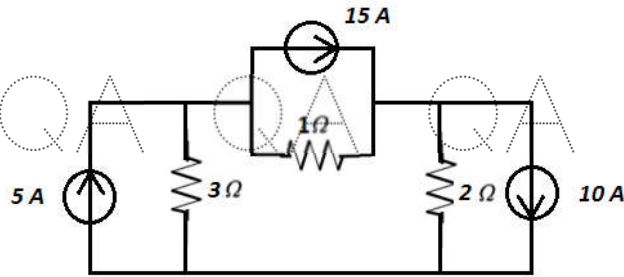


Figure 2

- 4.a) What is the RMS value of a sinusoidal waveform? Derive.
 b) A balanced load of $(5-j20)\ \Omega$ per phase, connected in delta is fed from a three phase 200V supply. Find the line current, power factor, total power, reactive power and complex power [5+5]

OR

- 5.a) Discuss in detail about resonance in series RLC circuit.
 b) Calculate the current and power factor in the following cases for the circuits having impedances as given, fed from an AC supply of 230 V, 50 Hz. (i) $Z = (10 + j20)\ \Omega$
 (ii) $Z = (10-j20)\ \Omega$. [5+5]

- 6.a) What is an ideal transformer? What are its features?
 b) Obtain the expression for the voltage regulation in transformer. [5+5]

OR

- 7.a) What are the losses in transformer? Explain.
 b) How a three phase transformer is made from single phase transformer? Explain the connections. [5+5]

- 8.a) What is rotating field? How it is generated in a 3-phase Induction motor.
 b) Explain the speed control of separately excited DC motor. [5+5]

OR

- 9.a) Give the detailed construction of single phase induction motor.
 b) Discuss in detail about the working of synchronous generator. [5+5]

- 10.a) How an MCB works? Discuss.
 b) What are the types of cables? Describe. [5+5]

OR

- 11.a) How an MCCB works? Discuss.
 b) Explain the important characteristics of batteries in detail. [5+5]

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