D **766B2** **Total pages: 2**

Register No: …… Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FRESHER ODD (SEMESTER 1) B.TECH DEGREE EXAMINATION (R), NOVEMBER 2024

Common to Computer Science and Engineering & Electrical and Electronics Engineering

(2024 SCHEME)

Course Code : **24EST1005-E**

Course Name : **Introduction to Electrical and Electronics Engineering**

Max. Marks : **60** **Duration:2.5 Hours**

PART I: ELECTRICAL ENGINEERING

Part I to be answered in pages 1 to 15

PART A

(Answer all questions. Each question carries 3 marks)

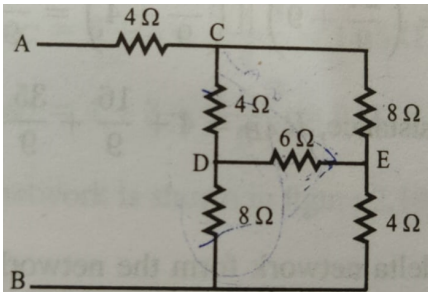
1. State Kirchhoff's Current Law (KCL) and explain how it is used in circuit analysis.
2. What is reluctance in a magnetic circuit? Write its formula and explain the factors that affect the reluctance of a material.
3. A series circuit with R= 10Ω and C=50μF has an applied voltage with a frequency such that the current leads by 30^0.What is the frequency of the voltage?
4. What are the advantages of three-phase systems over single-phase systems?

PART B

(Answer one full question from each module, each question carries 6 marks)

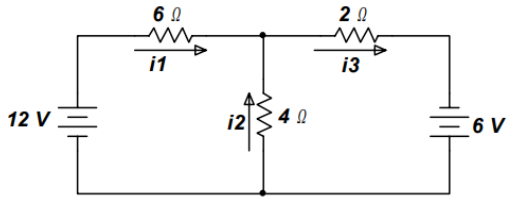
MODULE I

5. Find the total resistance of the circuit between the points A and B. 6



OR

6. Determine the currents i_1, i_2 and i_3 in the circuit shown below using mesh analysis. 6



MODULE II

7. An iron ring of mean circumference 200cm is uniformly wound with 500 turns of wire. Calculate the value of flux density to produce a current of 1 A in the ring. Assume μ_r =1200. 6

OR

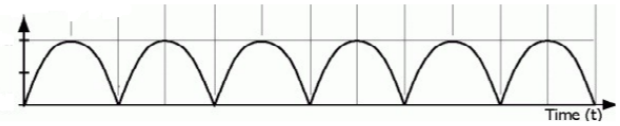
8. A coil of 200 turns of wire is wound on a magnetic circuit of reluctance 2000AT/Wb.If a current of 1A flowing in the coil is reversed in 10ms,find the average emf induced in the coil. 6

MODULE III

9. With a phasor diagram, derive the instantaneous power equation, when alternating current is supplied through a series RL circuit. Also, draw the impedance triangle and write an expression for active, reactive, and apparent power in the RL circuit. 6

OR

10. Find the average and rms value of a full wave rectifier output voltage waveform. 6



PART II: ELECTRONICS ENGINEERING

Part II to be answered in pages 16 to 30

PART A

(Answer all questions. Each question carries 3 marks)

11. A resistor has a color band sequence green, orange, red and gold. Find the terminal value and range of value which this resistor may have?

12. What is the purpose of filtering in a DC power supply?

13. What is the function of light sensors in instrumentation?

14. Describe the basic principle of operation of temperature sensors.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE IV

15. Explain the input and output characteristics of a common emitter configuration, including their graphical representations. 6

OR

16. Differentiate zener and avalanche breakdown. 6

MODULE V

17. Compare the principles of amplitude modulation (AM) and frequency modulation (FM). 6

OR

18. Explain the block diagram of GSM architecture. 6

MODULE VI

19. Discuss the operation of solenoids and relays, and how they are used in switching applications. 6

OR

20. Explain the working principle of a load cell and its applications in weight measurement. 6

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