Register No.: ……………………………. Name: ……………………………………………………………..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

### SECOND SEMESTER B.TECH DEGREE EXAMINATION (R,S), MAY 2024

Course Code: **20EST130**

Course Name: **Basics of Electrical and Electronics Engineering**

Max. Marks: **100** **Duration: 3 Hours**

PART I BASIC ELECTRICAL ENGINEERING
Part I to be answered in pages 1 to 15
PART A
(Answer all questions. Each question carries 4 marks)

1. State and explain Kirchoff's laws

2. Determine the current delivered by the source in the circuit shown below
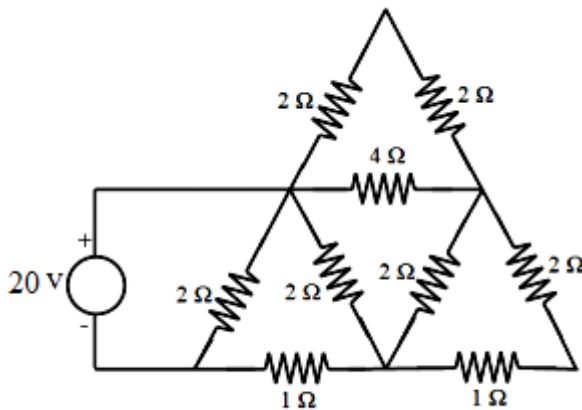

3. Define MMF, magnetizing force, flux density, reluctance

4. Distinguish between self-inductance and mutual inductance

5. A 10 Ω resistor & 300 μF capacitor are connected in series to a 240 V sinusoidal AC supply. The circuit current is 16 A. Calculate the supply frequency & phase angle between current & voltage.

PART B
(Answer one full question from each module, each question carries 10 marks)

MODULE I

Marks

6. For the circuit shown below, find current through 1 Ω and 3 Ω resistors and power dissipated in 4 Ω resistor using Node Analysis
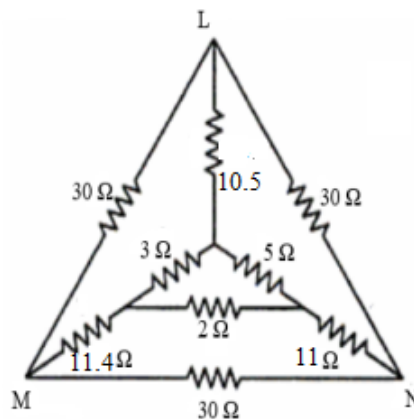
(10)
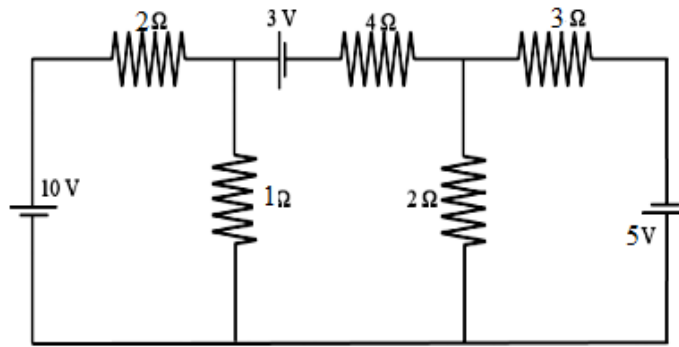
OR

Marks

7.   In the circuit shown below find the resistance between M and N using star-delta transformation

(10)

MODULE II

Marks

8.   a)   An alternating current is represented by $i=100 \sin 377\,t$ .Determine a) the frequency   b) the time taken to reach the maximum value in sec after passing through zero ,increasing positively

(2)

      b)   Calculate the rms and average values of a half wave rectified sinusoidal current wave .Also determine the form factor and peak factor.

(8)

OR

Marks

9.   a)   Differentiate between statically and dynamically induced emf.

(4)

      b)   A coil of insulated wire 600 turns and of resistance 4 Ω is closely wound on iron ring. The ring has a mean diameter of 0.3 m and a uniform cross sectional area of 700 mm². Calculate the total flux in the ring when a dc supply of 8 V is applied to the end of the winding. Assume a relative permeability of 1000.

(6)

MODULE III

Marks

10.   a)   An alternating voltage of (80+j60)V applied to a circuit and the current flowing is (-4+j10) A. Identify the circuit elements and find (i) the impedance of the circuit,(b) the power consumed and (c) the phase angle.

(6)

b) Define active, reactive & apparent power in an AC circuit with the help of power triangle. (4)

OR

Marks

11. a) Three similar coils connected in delta draw a total power of 2.5kW at a power factor of 0.7 lagging from a 3 phase 400V, 50Hz power supply. Calculate the resistance and inductance of each coil. (8)

b) List any four advantages of three phase system compared to single phase system. (2)

PART II BASIC ELECTRONICS ENGINEERING
Part II to be answered in pages 16 to 30
PART C
(Answer all questions. Each question carries 4 marks)

12. List the different types of capacitors available? Give the specifications of capacitors that are available in the market.

13. Define operating point in the context of a BJT amplifier. Draw the graph.

14. What is the need of voltage divider biasing in as RC coupled amplifier?

15. What is a transducer? What is the need of a transducer in an electronic circuit?

16. Differentiate AM and FM waves with necessary diagrams.

PART D
(Answer one full question from each module, each question carries 10 marks)

MODULE IV

Marks

17. a) Obtain the relation between CE, CB and CC in BJT. (5)

b) Write a short note on the principle operation of a PN junction diode. (5)

OR

Marks

18. a) Draw NPN structure of BJT and explain it. (5)

b) Explain the VI characteristics of a BJT with necessary graphs. (5)

MODULE V

Marks

19. Explain the working of a bridge rectifier with neat diagrams. What is the need of a capacitor in the circuit? (10)

OR

Marks

20. Draw the block diagram of an electronic instrumentation system and explain the working of each block in detail. (10)

MODULE VI

		Marks
21.	Explain the working of a superheterodyne receiver with neat block diagram.	(10)

OR

		Marks
22.	Draw the GSM architecture for mobile communication and explain each block.	(10)

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