Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER B.TECH DEGREE EXAMINATION (Special), AUGUST 2021

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)

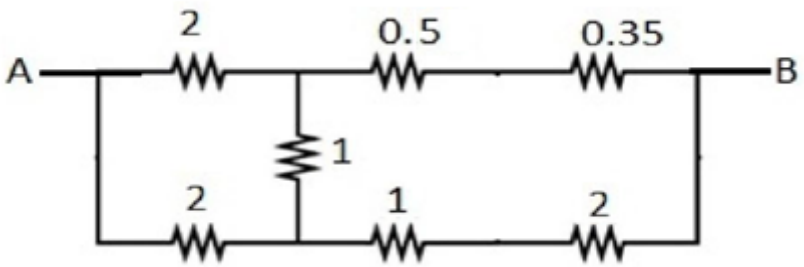
		CO
1.	A 50 Ω resistor is in parallel with a 100 Ω resistor. Current in 100 Ω is 3.6 A. What is the value of third resistance to be added in parallel to this circuit to make the total current 12.1 A?	[1]
2.	State and explain Faraday's Laws of electromagnetic induction.	[2]
3.	Define the terms (i) Peak factor and (ii) Form factor for a fully rectified sine wave.	[3]
4.	Derive the relation between line current and phase current in a three-phase star connected system.	[3]
5.	A 100 Ω resistor in series with 150 μF capacitor is connected to 230 V, 50 Hz supply. Find i) impedance ii) current iii) power factor iv) voltage across the resistor	[3]

PART B

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

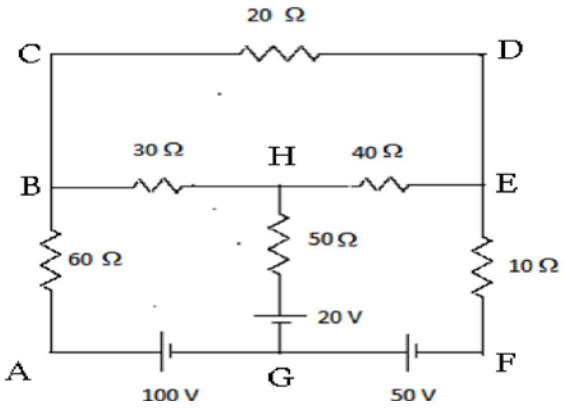
MODULE I

			CO	Marks
6.	a)	State and explain Kirchoff's laws with examples.	[1]	(4)
	b)	Determine the equivalent resistance across the terminals A and B. All resistors are given in ohms.	[1]	(6)



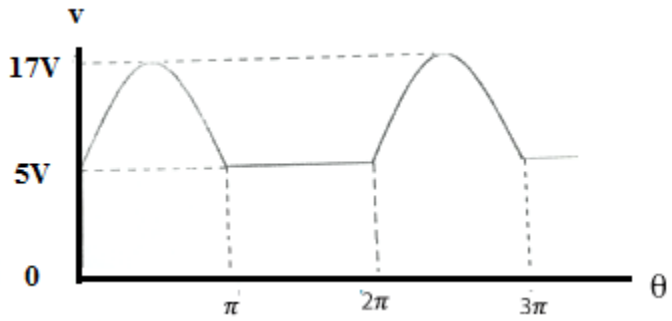
OR

			CO	Marks
7.	a)	What are the steps to be followed in nodal analysis?	[1]	(3)
	b)	Calculate the current flowing through 30 Ω and 50 Ω resistors using mesh analysis for the following circuit.	[1]	(7)



MODULE II

			CO	Marks
8.	a)	A mutual inductor with co-efficient of coupling equal to one is made from a primary coil of inductance 10 mH and a secondary coil of 20 mH. Find the value of mutual inductance.	[2]	(3)
	b)	Determine the effective and mean value of the given voltage waveform.	[2]	(7)



OR

			CO	Marks
9.		A steel ring of 25 cm diameter and of circular section 3 cm in diameter has an air gap of 1.5 mm length. It is uniformly wound with 1000 turns of wire carrying a current of 2 A. Calculate i) magneto motive force ii) magnetic flux density in air gap iii) magnetic flux iv) relative permeability of steel ring. Assume that iron path takes about 40% of the total mmf.	[2]	(10)

MODULE III

			CO	Marks
10.	a)	Prove that the total power consumed by a purely inductive circuit is zero.	[3]	(4)
	b)	Determine for a series RLC circuit with R = 15 Ω, L = 2 mH, C = 1 μF : (i) Impedance (ii) Current (iii) Voltage across L and C (iv) Power delivered to R (v) Power factor. The circuit is connected to a voltage source of voltage v = 50 sin628t.	[3]	(6)

OR

		CO	Marks
11.	Three inductive coils, each with a resistance of 22 Ω and an inductance of 0.05 H are connected in (i) star and (ii) delta, to a three phase 415 V, 50 Hz supply. Calculate for each of the above cases (i) phase current and line current and (ii) total power absorbed.	[3]	(10)

PART II BASIC ELECTRONICS ENGINEERING

Part II to be answered in pages 16 to 30

PART A

(Answer all questions. Each question carries 4 marks)

		CO
12.	For the samples given below, specify the nominal value, tolerance, maximum and minimum value a) A resistor coloured – yellow, violet, orange and gold b) A capacitor with code 104K	[4]
13.	Differentiate between avalanche breakdown and zener breakdown.	[4]
14.	Draw the block diagram of DC power supply and specify the functions of each block.	[5]
15.	Explain voltage divider biasing.	[5]
16.	Illustrate the concept of frequency reuse in cellular communication.	[6]

PART B

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

MODULE IV

			CO	Marks
17.	a)	Explain the specifications and features of carbon composition type resistors and carbon film type resistors.	[4]	(5)
	b)	With necessary diagrams and waveforms, describe the V-I characteristics of a PN junction diode.	[4]	(5)

OR

			CO	Marks
18.	a)	Draw and outline the input and output characteristics of common emitter transistor configuration.	[4]	(6)
	b)	Obtain the relation between the current gains β and α	[4]	(4)

MODULE V

		CO	Marks
19.	With necessary diagrams and waveforms, explain the working of a full wave bridge rectifier with capacitor filter.	[5]	(10)

OR

			CO	Marks
20.		With circuit diagram and waveforms, explain the working of a common emitter RC coupled amplifier. Draw and explain its frequency response.	[5]	(10)

MODULE VI

			CO	Marks
21.	a)	List about the frequency bands used for various communication systems.	[6]	(4)
	b)	With the help of block diagram, outline the working of super heterodyne receiver.	[6]	(6)

OR

			CO	Marks
22.	a)	Describe the principle of operation of GSM with block diagram	[6]	(6)
	b)	What is modulation. Differentiate between amplitude modulation and frequency modulation.	[6]	(4)

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