Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER B.TECH DEGREE EXAMINATION (Supplementary), December 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

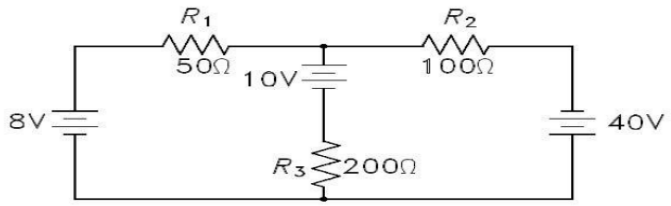
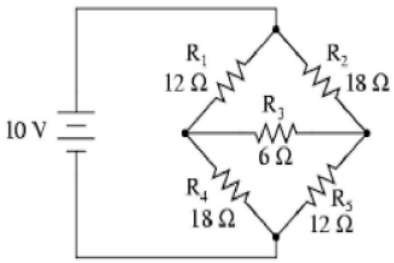
(Answer all questions. Each question carries 4 marks)

		CO
1.	State and explain Kirchhoff's laws.	[1]
2.	Three resistors each of 30 Ω are connected in delta. Obtain the equivalent star network .	[1]
3.	Define MMF, Magnetizing force, Flux density, Reluctance .	[2]
4.	Derive the relation between line and phase current in three phase delta connected system.	[3]
5.	What are the advantages of three phase system over single-phase system?	[3]

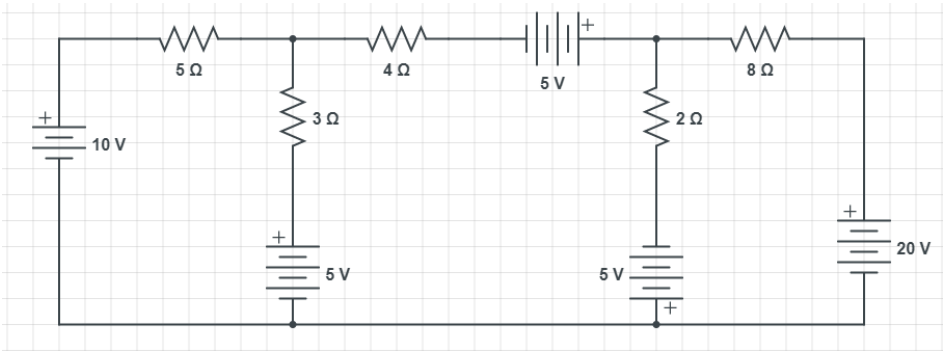
PART B

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

MODULE I

			CO	Marks
6.	a)	Calculate the current in each branch of the following circuit using mesh analysis. 	[1]	(5)
	b)	Determine the current drawn from the supply in the figure below using star-delta conversion. 	[1]	(5)

OR

			CO	Marks
7.	Determine the current in the 3 Ω resistor. 		[1]	(10)

MODULE II

			CO	Marks
8.	a)	Derive the rms value of a pure sinusoidal wave form.	[2]	(3)
	b)	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. Assume that iron path takes about 40% of the total mmf	[2]	(7)

OR

			CO	Marks
9.	a)	Compare electric and magnetic circuit in terms of any two similarities and two dissimilarities.	[2]	(4)
	b)	An iron ring 15 cm mean diameter and 10 cm^2 in cross-section is wound with 200 turns of wire. For a flux density of 1 Wb/m^2 and a relative permeability of 500, calculate the exciting current, inductance and energy stored when there is 2 mm air gap.	[2]	(6)

MODULE III

			CO	Marks
10.	a)	A series RC circuit takes a power of 7000 W when connected to 200 V, 50 Hz supply. The voltage across the resistor is 130 V. Calculate i) Resistance ii) Power factor iii) Current iv) Capacitance .	[3]	(4)
	b)	A balanced three phase load has per phase impedance of (30+j50) Ω. If the load is connected across 400 V, 3 phase supply, find (i) phase current (ii) line current and (iii) power supplied to load when it is connected in star connection	[3]	(6)

OR

			CO	Marks
11.	a)	A resistance of 5 Ω and an inductor of 15 mH are connected in series across a 230V, 50 Hz single phase ac supply. Calculate the (i) current (ii) power factor (iii) power consumed (iv) What value of capacitor must be connected in series with this combination so as to improve the power factor to 0.9.	[3]	(8)
	b)	A balanced star connected load of (8+j6) Ω per phase is connected to a three-phase 415 V supply. Find the line current and power factor.	[3]	(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)

		CO
12.	The colour bands marked on a resistor are Orange, Orange, Yellow and No colour. What is the value of the resistor? What are the minimum and maximum resistance values expected from that resistance?	[4]
13.	Describe Zener breakdown and Avalanche breakdown.	[4]
14.	Describe the working of a full wave centre tap rectifier.	[4]
15.	With the help of block diagram, explain Electronic Instrumentation System.	[5]
16.	Compare AM and FM communication systems.	[6]

PART D

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

MODULE IV

			CO	Marks
17.	a)	Describe Trimmer capacitor.	[4]	(3)
	b)	With neat circuit diagram, explain and plot the Forward and Reverse characteristics of a pn junction diode.	[4]	(7)

OR

			CO	Marks
18.	a)	Define Self-inductance and Mutual inductance.	[4]	(4)
	b)	Sketch and explain the typical input-output characteristics of a BJT when connected in Common Emitter configuration.	[4]	(6)

MODULE V

			CO	Marks
19.	a)	With a neat circuit diagram, explain the working of an RC Coupled amplifier.	[4]	(6)
	b)	Draw the frequency response characteristics of an RC Coupled amplifier and state the reasons for the reduction of gain at lower and higher frequencies.	[4]	(4)

OR

			CO	Marks
20.	a)	Explain the working of a full wave bridge rectifier with capacitor filter.	[4]	(5)
	b)	With the help of block diagram, describe Public Address System.	[5]	(5)

MODULE VI

			CO	Marks
21.	a)	Define modulation? Explain the need for modulation.	[6]	(4)
	b)	With the help of a block diagram, explain the working of Super heterodyne receiver.	[6]	(6)

OR

			CO	Marks
22.	a)	With neat sketches explain a cellular communication system.	[6]	(5)
	b)	Explain GSM communication with the help of a block diagram.	[6]	(5)

****