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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER B.TECH DEGREE EXAMINATION (R), DECEMBER 2022

(2020 SCHEME)

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. Determine the total current, voltage across each resistor and power dissipated in each resistor when 2 Ω,3 Ω and 5 Ω resistors are connected in series across a 100V supply.
2. A coil of 200 turns is linked by a flux of 40 mWb. If this flux is reversed in a time of 4m sec, calculate the average e.m.f induced in the coil.
3. Determine the average value of a half wave rectified sinusoidal current waveform.
4. Draw the circuit diagram of a series R.L.C circuit and write the equations for its impedance and power factor.
5. Why a three-phase system is preferred over a single-phase system.

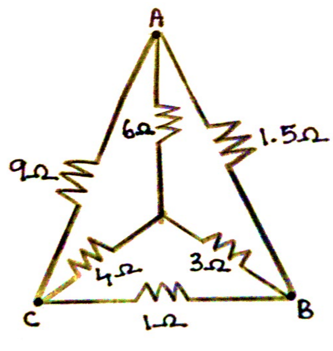
PART B

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

MODULE I

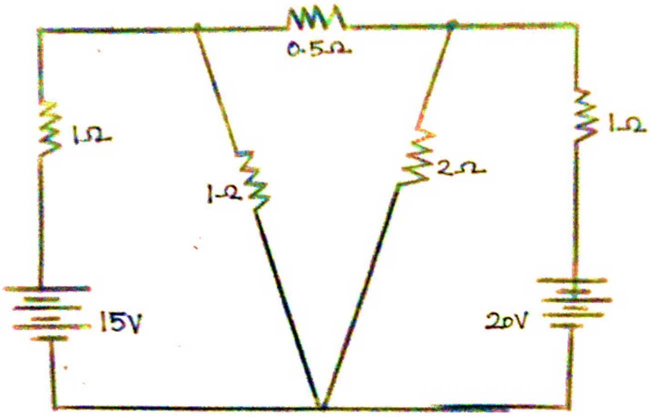
6. a) Derive the expression for energy stored in an inductor. (4)

   b) Calculate the resistance between terminals A and C, for the network shown in figure using star delta transformation. (6)



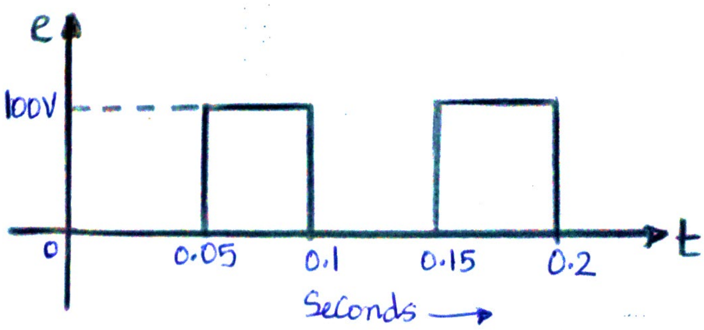
OR

7. Calculate the power consumed by a 2Ω resistor shown in the figure using nodal analysis. (10)



MODULE II

8. a) With a peak value of 100 Volts and a time period of 0.1 seconds, a periodic series of rectangular pulses is depicted in the figure. Calculate the form factor of the wave given below. (6)



b) Write the mathematical expression for a 50Hz sinusoidal voltage with a peak value of 60V.Sketch the waveform in terms of time. (4)

OR

9. a) A steel ring with a relative permeability of 900 and a mean circumference of 40 cm and a cross sectional area of 5 cm^2 is wound uniformly with 300 turns of a coil. If the coil is connected to 250V d.c. and has a resistance of 100Ω. Calculate the following: (i) coil m.m.f. (ii) field strength (iii) total flux (iv) ring reluctance (v) and ring permeance. (8)

b) Compare statically induced e.m.f and dynamically induced e.m.f. (2)

MODULE III

10. a) Draw the impedance triangle of R-L series circuit and write the equation of its power factor and phase angle. (3)

b) A 500 W of power is dissipated by a coil when it is connected across a 100 V, DC supply. It dissipates 200 W when connected across a 100 V, 50 Hz AC supply. Determine the coil's resistance (7) and inductance values.

OR

11	a)	Three similar resistors are connected in star across 400 V,3 phase lines. The line current is 5A. Calculate the value of each resistor. To what value should the line voltage be changed to obtain the same line current with the resistor's delta connected.	(6)
	b)	Explain the power triangle in an AC circuit.	(4)

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 resistor. Explain any two fixed resistors.
13. A capacitor has color band of Red, Violet, Yellow and Green. Find the minimum and maximum capacitance values that can be obtained.
14. Illustrate electronic instrumentation system with suitable block diagram
15. Identify the concept of voltage divider biasing.
16. Explain principle of antenna operation.

PART D

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

MODULE IV

17.	a)	Distinguish the relation between the current gain of CE, CB and CC configuration.	(5)
	b)	Explain about avalanche breakdown.	(5)

OR

18.	a)	Explain the principle of operation of NPN transistor.	(5)
	b)	Draw and explain the V-I characteristics of PN junction diode.	(5)

MODULE V

19.	a)	Explain the working of RC coupled amplifier with neat diagram.	(6)
	b)	Explain the block diagram of public addressing system.	(4)

OR

20.	a)	Summarize the role of filter in DC power supply.	(4)
	b)	Outline the working of simple voltage regulator.	(6)

MODULE VI

21. Explain in detail about cellular communication. (10)

OR

22. Describe the AM heterodyne receiver. Also, draw and explain the frequency spectrum of AM wave. (10)

****