Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER B.TECH DEGREE EXAMINATION (REGULAR), JULY 2022

(2020 SCHEME)

Course Code: **20EST130**

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

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

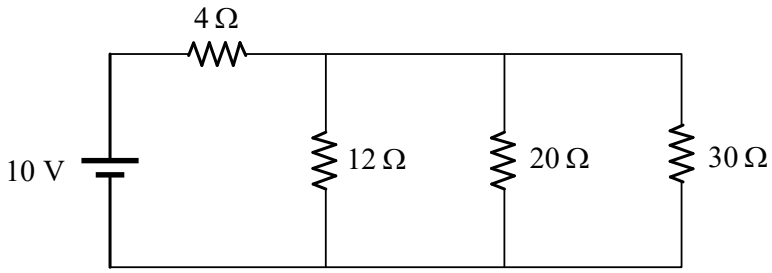
PART I BASIC ELECTRICAL ENGINEERING

Part I to be answered in pages 1 to 15

PART A

(Answer all questions. Each question carries 4 marks)

1. Find the current through the 12 Ω resistance by using appropriate method.



2. In a sinusoidal supply of 240 V rms and frequency of 50 Hz, find the instantaneous voltage at 6 ms after a negative to positive zero crossing.
3. A coil with 100 turns and ring-shaped magnetic core is carrying 1 A direct current. If the core has an effective length of 50 cm, area of cross section of 2 sq.cm. and relative permeability of 800, find the magnetic flux density in the core.
4. Two impedances (5+j3) Ω and (3-j5) Ω are connected in series and the combination is connected to a 100 V AC supply. Find the current and state whether the current will be lagging or leading.
5. What are the advantages of using three-phase supply system over single-phase systems?

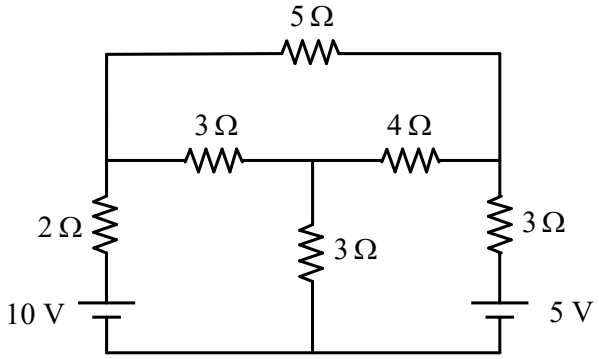
PART B

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

MODULE I

6. a) State and explain Kirchhoff's laws. (4)

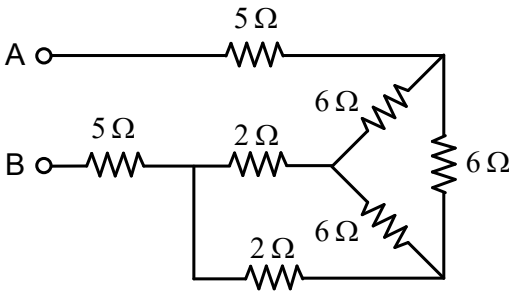
b) Find the current through the 5 Ω resistance in the circuit below. (6)



OR

7. a) Derive the expression for delta to star transformation of resistive network. (5)

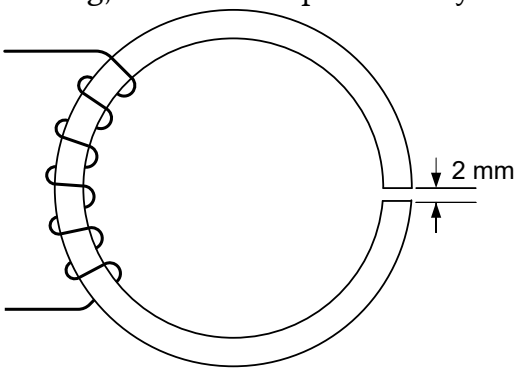
b) Find the effective resistance between points A and B of the circuit below. (5)



MODULE II

8. a) Define form factor. What is the form factor value of pure sine wave? (2)

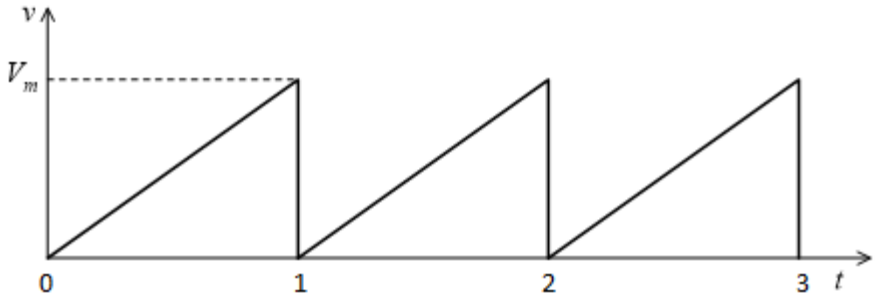
b) An iron ring of shape as shown in figure is wound with 200 turns of wire. The mean length of the core is 100 cm and the length of airgap is 2 mm. The cross-sectional area of the core is 10 cm^2. Calculate the current required to produce a flux of 1 mWb in the ring, if the relative permeability of iron is 2000. Neglect fringing and leakage flux. (8)



OR

9. a) Define the terms mmf and magnetic field strength. (2)

b) Find the average value and rms value of the sawtooth waveform with maximum value of V_m as shown below. (8)



MODULE III

10. a) A series circuit consists of R = 20 Ω, L = 20 mH and is connected to an AC supply of 100 V, 60 Hz. Find the voltage across L. (4)

b) Draw the phasor representation of phase voltages and line voltages of a three-phase star connected network and derive the expression relating the phase voltage and line voltage. (6)

OR

11. a) A resistor of 250 Ω is connected in series with a capacitor of 10 μF. If the combination is connected to a 50 Hz sine wave voltage source of 240 Volts, find the current through the circuit. Represent the voltage and current in a phasor diagram. (4)

b) A balanced star connected three phase load with (40+j30) Ω in each phase is connected to a 400 V, three phase AC supply. Find the line current, total power consumed and the power factor of the load. (6)

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. Write any four applications of electronics in communication.
13. Derive the relation between current gains in common base and common emitter configurations.
14. Draw and explain the working of a simple zener voltage regulator.
15. Illustrate the concept of voltage divider biasing.
16. Explain the need for modulation in communication.

PART D

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

MODULE IV

17. a) Explain the working of NPN transistor with necessary diagram. (10)

OR

18. a) Explain color coding in resistors. (5)
    b) Illustrate the classification of capacitors with suitable examples. (5)

MODULE V

19. a) Draw and explain the public addressing system. (5)
    b) Explain the working of RC coupled amplifier with help of necessary diagrams. (5)

OR

20. a) Explain the working of a full wave bridge rectifier. (5)
    b) Draw the block diagram of dc power supply and explain the function of each block. (5)

MODULE VI

21. a) Compare AM and FM. (4)
    b) Draw and explain the block diagram of a super heterodyne receiver. (6)

OR

22. a) Explain GSM communication with the help of a block diagram. (7)
    b) Explain frequency reuse in mobile communication. (3)

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