

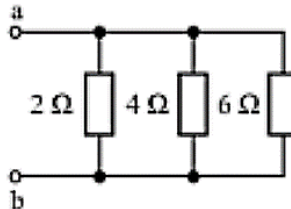
Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023**(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. Explain Lenz's law with neat diagram.
2. Find the equivalent resistance of the parallel combination shown in the figure below. If 10A current enters the parallel combination at point a, what will be the current flowing through 2Ω and 6Ω resistors.



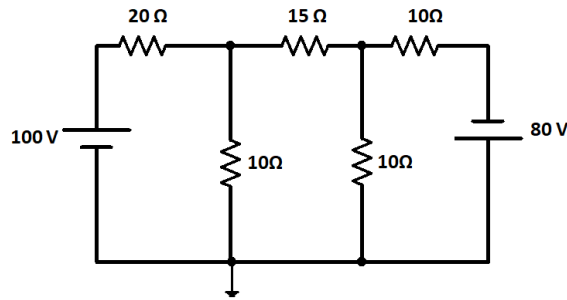
3. Consider an alternative current, $i=14.14 \sin 377t$ V. Find (i) RMS value of the current, (ii) frequency (iii) the instantaneous value of the current when 't' is 3ms, (iv) the time taken for the current to reach 10A for the first time after passing through zero value.
4. An alternating current of frequency 60 Hz has a maximum value of 120 A. Write down the equation for its instantaneous value. Reckoning time from the instant the current is zero and is becoming positive, find (a) the instantaneous value after 1/360 second and (b) the time taken to reach 96 A for the first time.
5. What is a three-phase system? Explain the generation of three phase system.

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

6. a) Explain the concepts of voltage and current divider rule with neat circuit diagrams. (6)
- b) Four resistances of ohmic values 10 Ω, 20 Ω, 30 Ω and 40 Ω are connected in series across 200 V source. How is the voltage divided among the given resistors? (4)

OR

7. By node voltage method, find the current through 15Ω resistor in the circuit shown below.



(10)

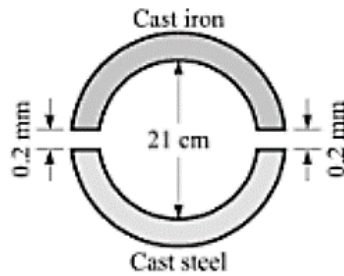
MODULE II

8. a) Derive the expression for coefficient of coupling. (5)
 b) State and explain Faraday's laws of electromagnetic induction. (5)

OR

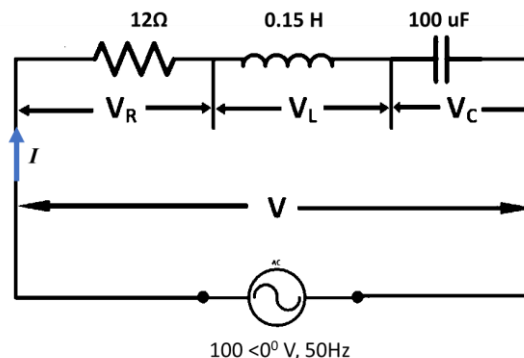
9. A ring having a mean diameter of 21cm and a cross sectional area of 10 cm^2 is made up of semicircular sections of cast iron and cast steel with each joint having reluctance equal to an air gap of 0.2mm as shown in the figure. Determine the ampere turns required to produce a flux of 0.8mWb. The relative permeabilities of cast iron and cast steel are 166 and 800 respectively. Neglect fringing and leakage effects.

(10)



MODULE III

10. For the circuit shown, calculate the impedance, the current, phase angle, voltage across each element, power factor, the apparent power and the average power. Also draw the voltage phasor diagram of the following network.



(10)

OR

11. a) A balanced three phase load consists of three coils each having resistance of 20Ω and inductance 0.5 H . It is connected to a 400 V , 50Hz , 3-phase ac supply. Determine the phase voltage, phase current, power factor and active power when the loads are connected in star (5)
- b) Derive the relation between line and phase voltage in a three-phase star connected system with the help of phasor diagram. (5)

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)*

12. Determine the resistance value of a resistor whose colour band sequence is given as red, green and yellow. What is the minimum and maximum resistance value ?
13. Explain the current gain of CE and CB configuration. Derive the relationship between α and β .
14. Explain the operation of capacitor filter.
15. Explain the principle of an antenna.
16. Compare AM and FM.

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

17. a) Explain the different types of fixed capacitors. (3)
- b) Explain the operation of a PN junction diode. Also draw its VI characteristics. (7)

OR

18. a) Explain the principle of operation of avalanche breakdown. (3)
- b) With neat sketches explain the input and output characteristics of BJT in common emitter configuration. (7)

MODULE V

19. a) Explain the working of a zener voltage regulator. (4)
- b) With neat diagrams, explain full wave bridge rectifier. (6)

OR

20. a) With neat circuit diagram, explain the working of RC coupled amplifier. (6)

- b) Draw and explain the frequency response characteristics of RC coupled amplifier. (4)

MODULE VI

21. a) Define amplitude modulation. Derive the expression for an amplitude modulated wave. (6)
b) Explain the cellular concept in mobile communication. (4)

OR

22. a) With the help of block diagram explain the working of super heterodyne receiver. (5)
b) Explain the block diagram of GSM. (5)
