D Total Pages: **3**

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

SAINTGITS COLLEGE OF ENGINEERING
KOTTAYAM, KERALA

(AN AUTONOMOUS COLLEGE AFFILIATED TO
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER B.TECH DEGREE EXAMINATION(S), JULY 2021

Course Code: 20EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

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

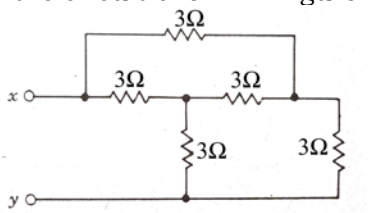
PART I BASIC ELECTRICAL ENGINEERING

Part I to be answered in pages 1 to 15

PART A

(Answer all questions. Each question carries 4 marks)

1. Find the equivalent resistance of the circuit shown in figure using star-delta transformation.



2. State and explain statically induced emf and dynamically induced emf.
3. Define the terms (i)MMF (ii) Reluctance (iii) Permeability (iv) Frequency
4. Two impedance Z_A and Z_B are connected in series across a voltage source of $100\angle 30°$V. The values of impedances are (4+j7)Ω and (2-j2)Ω respectively. Determine the current through the impedances and total power absorbed by the circuit.
5. What are the advantages of three phase system over single-phase system.

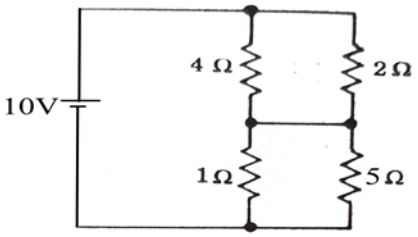
PART B

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

MODULE I

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

   b) Determine the current through the resistor 5Ω in the circuit shown in Figure. (6)



OR

7. Calculate the current through 4Ω resistor in the circuit shown in figure using nodal analysis by matrix method. (10)

MODULE II

8. a) Compare electric and magnetic circuits. (4)

   b) An iron ring has a mean length of 1.0m and a cross sectional area of $10cm^2$. It has a radial air gap of 2mm. Calculate the current required in a coil of 2000 turns uniformly placed around the core to produce a flux of 1.0mWb in the air gap. Assume the leakage factor as 1.2 and the relative permeability of iron is 400. (6)

OR

9. a) Define coefficient of coupling and derive the expression for it. (4)

   b) Determine the rms, average value and form factor of the sinusoidally varying current of peak value 10A. (6)

MODULE III

10. A coil having a resistance of 50Ω and an inductance of 0.02H is connected in series with a capacitor of 25μF across a single phase 200V, 50Hz supply as shown in figure. Calculate (i) total current drawn (ii) voltage across the capacitor (iii) voltage across the coil (iv) total power factor (v) total power consumed by the circuit. (10)

OR

11. Three similar coils A, B, C, each has a resistance of 9Ω and inductive reactance of 12Ω is connected to a three-phase supply 440V, 50Hz. Calculate for this load (i) phase current (ii) line current (iii) power factor (iv) total KVA (v) active power (vi) reactive power. If these coils are connected in (i) Star and (ii) Delta (10)

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. Describe the important specifications of an inductor.
13. Define current gain of common emitter configuration. Obtain the relationship between current gains in common emitter and common base configuration.
14. Why do we need filters in a power supply? Under what condition we shall prefer a capacitor filter?
15. What do you understand by transistor biasing? Give its importance.
16. What are the merits and demerits of amplitude modulation over frequency modulation?

PART D

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

MODULE IV

17. a) Discuss the colour coding scheme of resistors. (6)

    b) A carbon resistor has colour bands green, blue, red and gold. What is the minimum and maximum resistance values expected from that resistance? Also write the colour band sequence for 1Ω. (4)

OR

18. a) With neat diagram explain the operation of NPN and PNP transistors. (6)

    b) Explain the formation of the depletion region in an open circuited PN – junction. (4)

MODULE V

19. a) Draw the block diagram of a public address system and explain the functions of each block. (4)

    b) Sketch and explain the working of an RC coupled amplifier. (6)

OR

20.	a)	With circuit diagram and waveforms explain the working of bridge rectifier.	(6)
	b)	With neat diagram explain the working of a simple zener regulator.	(4)

MODULE VI

21.	a)	Explain the working of super heterodyne receiver with block diagram.	(7)
	b)	Briefly describe the principle of an antenna.	(3)

OR

22.	a)	Explain the concept of cell in cellular communication system.	(3)
	b)	Explain the working of a GSM system with necessary block diagram.	(7)

****