#### 03GXEST104122404

Reg No.:

Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY B.Tech Degree S1 (S) Examination May 2025 (2024 Scheme)

#### Course Code: GXEST104

## Course Name: INTRODUCTION TO ELECTRICAL AND ELECTRONICS ENGINEERING

Max. Marks: 60

5

Duration: 2 hour 30 minutes

- Use separate answer sheets for Part 1 and Part 2
- No separate minimum marks are required to pass.

# **PART 1:**

#### **ELECTRICAL ENGINEERING (30 Marks)**

#### PART 1-A

	Answer all questions. Each question carries 3 marks	со	Marks
1	State and explain Kirchhoff's laws.	1	3
2	Define the following terms i) Magnetic Flux density ii) Magneto motive force iii) Magnetic field Strength	2	3
3	Define active power, reactive power, and apparent power.	1	3
4	Show that for a sinusoidal voltage RMS value is 0.707 times its maximum value	1	3
	PART 1-B		
	Answer any one full question from each module. Each question carries 9 marks		

Module 1

In the circuit of Fig. 1, find the mesh currents  $I_1$ ,  $I_2$ ,  $I_3$ 

1

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Calculate the equivalent resistance between the points A and B of Fig.2.

a

6

7



6

1



	b	Define reluctance. List the factors on which the reluctance of a magnetic material depends.	2	3
		Module 2		
	a	Define self-inductance of a coil. Derive an expression for the self-inductance.	2	3
7	b	A coil of resistance $12 \Omega$ and inductive reactance of $25 \Omega$ is connected in series with a capacitive reactance of $41 \Omega$ . The combination is connected to a supply of $230 V$ , 50Hz. Find (i) circuit impedance (ii) current and (iii) power consumed.	1	6
8	a	A 3-phase, 400 V, 50 Hz a.c. supply is feeding a 3-phase delta-connected load with each phase having a resistance of 25 $\Omega$ , an inductance of 0.15 H and a capacitor of 120 $\mu$ F in series. Find impedance, power factor, line current, apparent power, active power, and reactive power.	3	6
	b	List any three advantages of three-phase system over single-phase system	3	3.

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# PART 2

ELECTRONICS ENGINEERING (30 Marks)

# PART 2-A

	Answer all questions. Each question carries 3 marks	СО	Marks
1	Draw the block diagram of a DC power supply and explain	4	3
2	Differentiate between Zener and Avalanche breakdown	4	3
3	With the help of a neat block diagram, explain the components of a basic communication system	5	3
4	Explain the need for modulation	5	3

## PART 2-B

# Answer any one full question from each module. Each question carries 9 marks

		Module 3		
5	a)	Explain the construction and working of an n-channel enhancement type MOSFET. Use figures wherever necessary	4.	7
	b)	Write the relation between $\alpha$ , the current gain CB configuration and $\beta$ , the current gain in CE configuration.	4	2
6	a)	Draw the frequency response of an RC coupled amplifier. Explain why the gain is reduced at low and high frequencies	4	5
	b)	Explain the working of a PN junction diode when it is forward biased.	4	4
		Module 4		
7	a)	Explain the working of an FM receiver based on superheterodyne principle.	5	6
	b)	What are the advantages of optical communication?	5	3
8	a)	What are the essential components of a CRO?	6	3
	b)	With the help of a neat block diagram, explain the components of an electronic instrumentation system	6	6

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