Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1(S) Examinations May 2026 (2024 Scheme)

Course Code: GXEST104

Course Name: INTRODUCTION TO ELECTRICAL AND ELECTRONICS ENGINEERING

Max. Marks: 60 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
Module (1 & 2)

		Answer all questions. Each question carries 3 marks	CO	Marks
1		State Kirchoff's laws in an electric circuit.	1	3
2		Compare series and parallel magnetic circuits	2	3
3		Derive the expression for coupling coefficient K in a coupled circuit. What are the indications for the following values of K, (i) K = 0 and (ii) K = 1?	1	3
4		Show that the average power absorbed by a pure capacitive load is zero.	1	3

PART 1-B
Module (1&2)

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

Module 1

5	a)	Differentiate between statically induced emf and dynamically induced emf with an example for each.	1	3
	b)	Apply Kirchoff's laws to find the currents I_1, I_2 and I_3 in the circuit shown in figure (1).	1	6

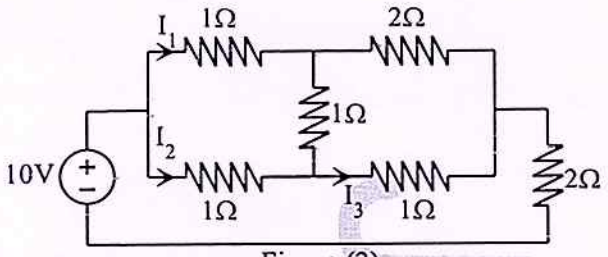

Figure (2)

6 a) Derive the expression for energy stored in an inductor. 1 3

b) Determine the mesh currents in the circuit of Figure 2. 1 6

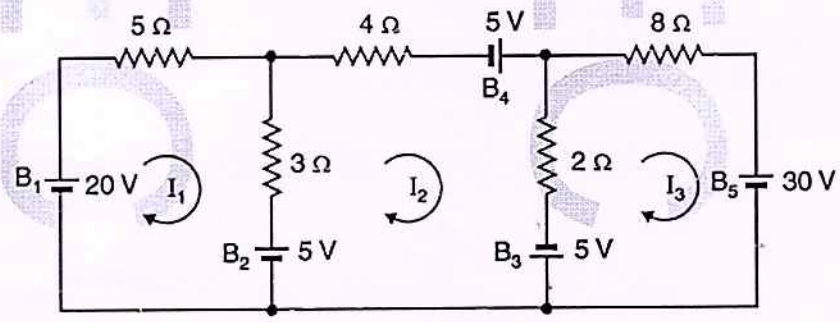

Figure 2

Module 2

7 a) The instantaneous value of a voltage is given as $v(t) = 100\sin 377t$ volts. Determine its frequency, time period, RMS value, average value, form factor and peak factor. 1 4

b) A series RLC circuit with R = 4Ω, X_L = 5Ω and X_C = 2Ω is supplied from a 50V supply. Find the impedance, power factor and current drawn from the supply. Also find the voltage across R, L and C. 1 5

8 a) State and explain Faraday's laws of electromagnetic induction. 1 4

b) A 3-phase 100V, 50Hz balanced supply is connected to a balanced 3-phase delta-connected R-L load with R = 5Ω and L = 0.01H. Find the current drawn from the supply and the current flowing through each phase of the load. Also draw the phasor diagram. 3 5

PART 2: ELECTRONICS ENGINEERING (30 Marks)

PART 2-A
Module (3 & 4)

Answer all questions. Each question carries 3 marks

			CO	Marks
1		Derive the ripple factor of a full wave rectifier without filter .	4	3
2		Explain the process of avalanche breakdown..	4	3
3		What is the need for modulation?	5	3
4		Explain the general block diagram of communication system.	5	3

PART 2-B
Module (3 & 4)

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

Module 3

			CO	Marks
5	a)	Explain the construction and working of an N-channel MOSFET.	4	5
	b)	Explain with a neat circuit diagram how a Zener diode can be used as a voltage regulator.	4	4
6	a)	Explain the input and output characteristics of BJT in Common Emitter configuration.	4	6
	b)	Explain why the gain of an RC-coupled amplifier falls at high and low frequencies.	4	3

Module 4

			CO	Marks
7	a)	Draw the block diagram and explain the principle and working of an FM superheterodyne receiver.	5	5
	b)	Describe the functions of various components of Network Switching System in GSM.	5	4
8	a)	Draw the block diagram of a digital multimeter and explain.	6	5
	b)	Draw the block diagram of a function generator and explain.	6	4

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