Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (R,S) Examination December 2025 (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	Three lamps are connected in series across a 120 V supply and take a current of 1.5 A. If the resistance of two of the lamps is 30 Ω each, what is the resistance of the third lamp?	1	3
2	Compare series and parallel magnetic circuits.	2	3
3	State and explain Faraday's Laws of Electromagnetic induction and Lenz's law.	1	3
4	An alternating current is given by i=62.35 sin(314t) A. Find its frequency, rms value and average value of current.	1	3

PART 1-B
Module (1&2)

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

Module 1

5	Determine the mesh currents in the circuit of Figure 1.	1	9

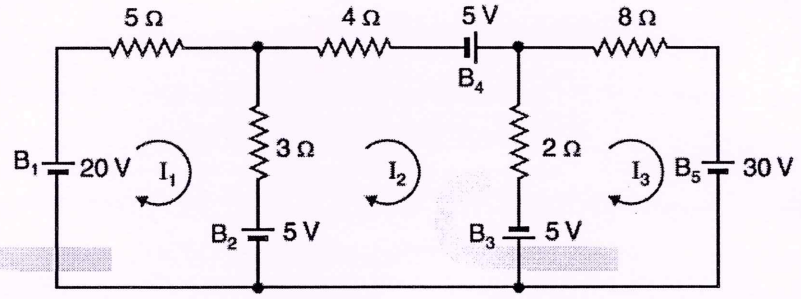

Figure 1

6 Determine the currents in different branches of the circuit shown in Figure 2 using nodal analysis. 1 9

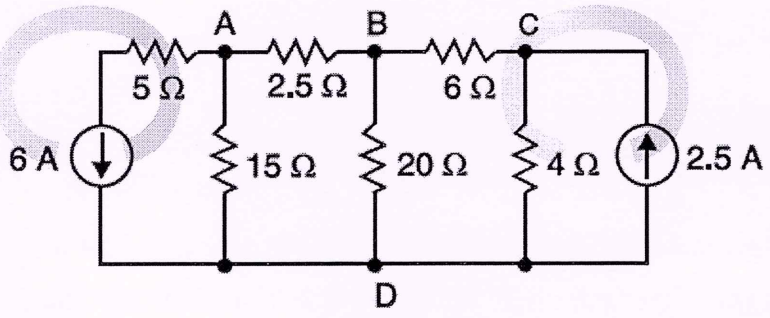

Figure 2

Module 2

7 a) A series circuit with a resistance of 10 Ω, inductance of 0.1H and capacitance of 150 μF is connected across a 200 V, 50 Hz supply. Find i) inductive reactance, ii) capacitive reactance, iii) impedance, iv) current, v) power factor, vi) voltage across the coil, and vii) voltage across the capacitor. 1 7

b) Differentiate between statically induced emf and dynamically induced emf with an example for each. 2 2

8 a) With a neat phasor diagram, derive the relation between line and phase voltages and currents in a star connected network. 3 4

b) Three-phase star-connected load when supplied from 400 V, 50 Hz source takes a line current of 10 A at 66.86° w.r.t. its line voltage. Calculate (i) resistance /phase, (ii) reactance/phase,(iii) impedance/phase, (iv)) power factor, and (v) active power consumed. 3 5

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PART 2
ELECTRONICS ENGINEERING (30 Marks)

PART 2-A
Module (3 & 4)

Answer all questions. Each question carries 3 marks

			CO	Marks
1		Differentiate active and passive components.	4	3
2		Explain the forward and reverse characteristics of a PN-junction diode with a neat plot.	4	3
3		With a neat waveform explain Amplitude Modulation.	5	3
4		Compare 4G and 5G communication technologies.	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 with a neat diagram the working of a full wave bridge rectifier with filter.	4	6
	b)	Compare BJT in common emitter, common base and common collector configurations.	4	3
6	a)	With a neat circuit diagram, explain the working of an RC coupled amplifier and also draw the frequency response	4	6
	b)	Derive the ripple factor of a full wave rectifier with filter.	4	3

Module 4

			CO	Marks
7	a)	Draw the block diagram and explain the principle and working of an AM superheterodyne receiver.	5	5
	b)	Draw and explain the block diagram of a Fiber Optic communication system.	5	4
8		With a neat diagram, explain the working principle of Cathode Ray Oscilloscope, detailing the function of each component. Also, explain Lissajous patterns in brief.	6	9