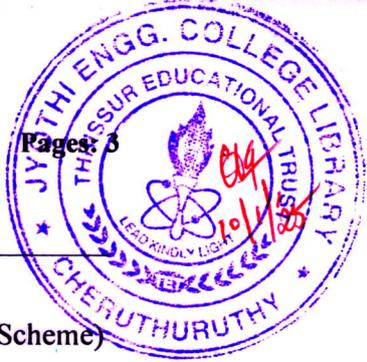


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester B.Tech Degree Regular Examination December 2024 (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 | Use current division rule to find current through each branch in a DC electric circuit with two resistances R_1 and R_2 in parallel and if the total current is I . | CO1 | 3 |
| 2 | Compare magnetic circuit and electric circuit. | CO2 | 3 |
| 3 | Differentiate between statically induced emf and dynamically induced emf with an example for each. | CO1 | 3 |
| 4 | State and explain Faraday's Laws of Electromagnetic induction and Lenz's law. | CO1 | 3 |

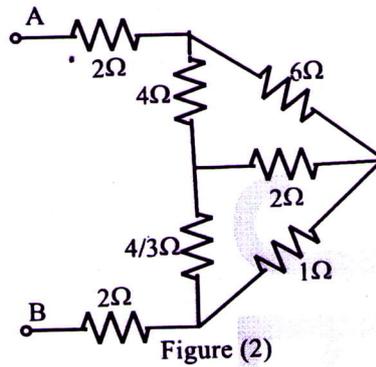
PART 1-B

Module (1&2)

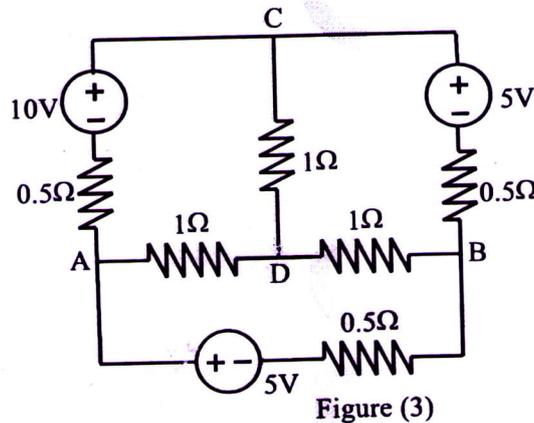
Answer any one full question from each module. Each question carries 9 marks

Module 1

- | | | | |
|---|--|-----|---|
| 5 | a) Derive the expression for energy stored in a capacitor | CO1 | 3 |
| | b) Use star-delta transformation technique to find the equivalent resistance between A and B in the circuit shown in figure (2). | CO1 | 6 |



- 6 a) Derive the expression for coupling coefficient of a coupled coil with self-inductances L_1 and L_2 and mutual inductance M . CO1 3
- b) For the circuit shown in figure (3), Determine the branch voltages V_{AB} , V_{BC} and V_{CA} using nodal analysis. Take D as reference node. CO1 6



Module 2

- 7 a) Derive the expression for RMS value, average value, form factor and peak factor of a sinusoidal voltage $v(t) = V_m \sin \omega t$ volts. CO1 4
- b) A series RLC circuit with $R = 5\Omega$, $L = 0.1H$ and $C = 5mF$ is supplied from a 100V, 10Hz supply. Find the impedance, power factor, current drawn from the supply, active power, reactive power and apparent power. CO1 5
- 8 a) Prove that the average power consumed in an inductance is zero if the input voltage is $v(t) = V_m \sin \omega t$ volts. CO1 4
- b) A 3-phase 100V, 50Hz balanced supply is connected to a balanced 3-phase RL load with $R = 3\Omega$ and $X_L = 4\Omega$. Find the current drawn from the supply if the load is i) star connected and ii) delta connected. CO3 5

PART 2: ELECTRONICS ENGINEERING (30 Marks)**PART 2-A****Module (3 & 4)***Answer all questions. Each question carries 3 marks*

CO Marks

- | | | | |
|---|--|-----|---|
| 1 | Differentiate between active and passive electronic components with suitable examples | CO4 | 3 |
| 2 | Draw the V-I characteristics of a PN junction diode and explain | CO4 | 3 |
| 3 | With the help of a neat block diagram, explain the building blocks of a basic fiber optic communication system | CO5 | 3 |
| 4 | Draw the block diagram of a function generator | CO6 | 3 |

PART 2-B**Module (3 & 4)***Answer any one full question from each module. Each question carries 9 marks***Module 3**

- | | | | |
|---|---|-----|---|
| 5 | a) Explain the working of an RC coupled amplifier with a neat circuit diagram. | CO4 | 6 |
| | b) For an NPN transistor if the common base current gain is 0.99 and collector current is 20mA, Find the value of base current and emitter current? | CO4 | 3 |
| 6 | What is a full wave rectifier? Explain the working of a full wave bridge rectifier using necessary diagrams. Write the equations for average value, rms value, ripple factor and efficiency for the same. | CO4 | 9 |

Module 4

- | | | | |
|---|---|-----|---|
| 7 | a) What do you mean by Amplitude Modulation and Frequency Modulation? Explain using diagrams. | CO5 | 6 |
| | b) What are Lissajous patterns in CRO? Draw the Lissajous patterns when the waveforms in two inputs are sine waves having equal frequency and 90° phase difference. | CO6 | 3 |
| 8 | a) Explain the principle of Global System for Mobiles Communication (GSM) using block diagram | CO5 | 6 |
| | b) Draw the block diagram of a digital multimeter | CO6 | 3 |
