

2.8 30264 THEORY OF ELECTRICAL ENGINEERING

UNIT-1 FUNDAMENTAL OF ELECTRICITY

- 1.1 Introduction
- 1.2 What is electricity?
- 1.3 Electric conductor
- 1.4 Electric tension or potential
- 1.5 Methods of generation of electric tension or voltage
- 1.6 Potential and potential difference
- 1.7 Applied voltage and voltage drop
- 1.8 Resistance inductance & capacitance in terms of dimension & the material

UNIT-2 CIRCUITS CONCEPTS

- 2.1 Concepts of network
- 2.2 Active and passive elements
- 2.3 Unilateral and Bilateral elements
- 2.4 Concepts of linearity and linear networks
- 2.5 Voltage and current source
- 2.6 Source transformation
- 2.7 Series or Parallel elements
- 2.8 Equivalent values of series or parallel connected passive elements

UNIT-3 DC CIRCUIT ANALYSIS AND NETWORK THEOREMS

- 3.1 Introduction
- 3.2 Network with single excitation
- 3.3 Excitations multiple branches of network
- 3.4 Superposition theorem
- 3.5 Kirchhoff's laws
- 3.6 Mesh analysis
- 3.7 Nodal analysis
- 3.8 Thevenin's theorem
- 3.9 Norton's theorem
- 3.10 Maximum power transfer theorem
- 3.11 Star-Delta conversion
- 3.12 Reinforcement example
- 3.13 Reciprocity theorem
- 3.14 Millman's theorem
- 3.15 Tellegen's theorem

UNIT-4 STEADY STATE ANALYSIS OF SINGLE PHASE AC CIRCUITS

- 4.1 AC fundamentals
- 4.2 Square wave AC
- 4.3 Triangular wave AC

- 4.4 Sinusoidal AC
- 4.5 Phase difference
- 4.6 Analysis of RLC circuits
- 4.7 Powers in AC circuits (Apparent, active & reactive powers)
- 4.8 Cartesian Rectangular, Trigonometric, Polar and Exponential Representations
- 4.9 Concepts of Admittance
- 4.10 Analysis of parallel RLC Circuits
- 4.11 Series-Parallel RLC Circuits
- 4.12 Significance of power factor
- 4.13 Resonance in series circuit
- 4.14 Parallel circuit resonance

UNIT-5 THREE PHASE AC CIRCUITS

- 5.1 What is three phase AC System
- 5.2 Necessity and advantages of 3- AC
- 5.3 Three phase AC generation
- 5.4 Star or Delta connections
- 5.5 Line and phase voltage
- 5.6 Power in 3- load
- 5.7 Measurement of power in three phase load
- 5.8 Importance of Earthling

UNIT-6 MEASURING INSTRUMENTS

- 6.1 Introduction
- 6.2 Types of Electrical Instruments
- 6.3 Principle of constructions of an indicating instrument
- 6.4 Construction and working principle of PMMC
- 6.5 PMMCs as ammeters and voltmeters
- 6.6 Currents and Multipliers
- 6.7 Construction and principle of operation of moving iron type instruments
- 6.8 Principle of operation and construction of dynamometer
- 6.9 Induction type energy meter

UNIT-7 INTRODUCTION OF POWER SYSTEM

- 7.1 Introduction
- 7.2 Electric power stations
- 7.3 general layout of electrical power system
- 7.4 Standard transmission and distribution voltages
- 7.5 Concept of power grid

UNIT-8 MAGNETIC CIRCUITS

- 8.1 Magnetic circuit concepts
- 8.2 Magnetic circuits

- 8.3 Analogies between magnetic and electric circuits
- 8.4 DC excitation and electric circuits
- 8.5 AC excitation 8.6 Magnetic leakage
- 8.7 Mutual coupling

UNIT-9 SINGLE PHASE TRANSFORMERS

- 9.1 Principle of operation
- 9.2 Principle of construction
- 9.3 EMF equation
- 9.4 Transformer on open circuit
- 9.5 A transformer on load
- 9.6 Equivalent circuit of a transformer
- 9.7 Phasor diagram
- 9.8 Tests on transformer
- 9.9 power losses
- 9.10 Efficiency
- 9.11 Introduction to Auto-Transformer
- 9.12 voltage regulation

UNIT-10 ELECTRICAL MACHINES

- 10.1 Electromechanical energy conversion
- 10.2 Dc machines
- 10.3 Three phase induction motor
- 10.4 Single phase induction motor
- 10.5 Three phase synchronous machines

UNIT-11 TRANSIENT RESPONSES OF RLC CIRCUIT WITH STEP INPUT OF SUPPLY

- 11.1 Transient response of RL circuit
- 11.2 Transient response of RC circuit
- 11.3 Transient response of RLC circuit

Reference Book:

1. Theory And Problems Of Basic Electrical Engineering 1st Edition (English, Paperback, D. P Kothari, I. J Nagrath)

