2.9 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 Equivalents 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
6.1Introduction
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 hunts 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 MAGNATIC 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 RESPONES 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

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