

DEE- 301 [ELECTRICAL MACHINE -I]

UNIT-I

Energy Conversion Principle - Law of conservation of energy, electromechanical energy conversion, classification of machines.

UNIT-II

D. C. Generator - Principle, construction, armature winding, types of winding, EMF equation, armature reaction and commutation, interpoles and compensating winding, types of generators, characteristics and applications, losses and efficiency, simple numericals.

UNIT-III

D.C. Motors - Principle, production of back EMF, torque equation, Classification, characteristics of D. C. motors, starters, speed control, losses and efficiency, applications of motors, Brake test, Swinburn test, simple numericals.

UNIT-IV

Single Phase Transformer - Principle, construction, classification, EMF equation, turns ratio, name plate rating, phasor diagram, no load and on load equivalent circuit, Voltage regulation, polarity ratio, open and short circuit tests, losses and efficiency, condition of maximum efficiency, all day efficiency and numerical, auto transformer, parallel operation of single phase transformer.

UNIT-V

Three Phase Transformer - Connections, groups, Scott and open delta connection, comparison of three phase transformer with bank of three single phase transformers, parallel operation.

List of Experiments:

1. 1 Study of D. C. Machines (Parts)
2. 2 Speed control of D. C. Motor (armature and field control method)
3. 3 To perform Swinburn test of DC Motor.
4. 4 Study of transformer (Parts) (single and three phase)
5. 5 To perform polarity test of single phase transformer.
6. 6 To perform ratio test of single phase transformer.
7. 7 To perform open circuit test of single phase transformer.
8. 8 To perform short circuit test of single phase transformer.
9. 9 Parallel operation of single phase transformer.

References:

1. Electrical Technology Vol. II by B. L. Thareja Khanna Publisher
2. Electrical Machines by Bhattacharya, T.T.T.I.
3. Electrical Machines by Nagrath & Kothari, PHI Publication
4. Electrical Machines Vol. I & II by P.S. Bhimbira, Khanna publishers

DEE- 302 [ELECTRICAL CIRCUIT]

UNIT-I

Circuit Analysis: Active and passive elements, ideal current source and voltage source, unilateral and bilateral elements, number of loops, nodes, branches of a network, analysis of networks by "Mesh" and "Node" methods, T and Π terminal networks, input and output impedance and admittance.

UNIT –II

Network Theorem: Maxwell's loop theorem, Nodal analysis, Superposition, Thevenin's, Nortons' and maximum power theorems with numericals.

UNIT-III

Single Phase A.C. Circuits : Representation of A.C. quantity by phasor methods, rectangular and polar co-ordinates, RLC series and parallel combinations, impedance, power in single phase circuits, concept of power factor, conductance, admittance and susceptance, series and parallel circuits, resonance in series circuit.

UNIT-IV

Polyphase Circuits: Concept of poly phase A.C. circuits, advantages over single phase, generation of three phase voltage system, three phase circuits, phase sequence, vector and wave diagrams, star and delta connections, phase and line values of current and voltage, power in three phase circuits, balanced and unbalanced systems.

UNIT-V

Transients : Concept of transient, variation of current when connected to D.C. or A.C. series circuit (R.L. combination and R.C. combination), time constant.

List of Experiments:

1. Verification of Superposition theorem
2. 2 Verification of Norton's and Thevenin's theorem
3. 3 Verification of Maximum power transfer theorem
4. 4 Performance of R-L-C- series circuit
5. 5 Performance of R-L-C- parallel circuit
6. 6 Study of electrical resonance in series circuit
7. 7 Verification of relation between line and phase voltage and current in
8. 3-phase circuit
9. 8 Study of transients.

References:

1. F F kuo Network Analysis and Synthesis John Wiley and Sons.
2. N Balabanian and T.A.Bickart Linear Network Theory; Analysis; Properties, Design and Synthesis; Matrix Publichers INC.
3. C.L.Wadhwa Network Analysis and Synthesis .New Age International.
4. B. Somanathan Nair Network Analysis and Synthesis.Elsevier Publication.

**DEE-303 [ELECTRICAL AND ELECTRONICS MEASUREMENT AND
MEASURING INSTRUMENT]**

UNIT-I

Introduction: Classification of measuring instruments, indicating, recording and integrating types of meters, errors and types of errors, accuracy, precision and sensitivity,.

UNIT-II

Electrical Measuring Instruments - Construction, operation, deflecting, controlling and damping forces, supporting systems, moving coil, electro-dynamometer, moving iron and induction type instruments, simple numerical, hot wire type instruments, vibration galvanometer, shunt and multipliers, CT & PT.

UNIT-III

Wattmeter and Energy meters – Dynamometer and induction type wattmeter, induction type energy meters, measurement of 1-phase and 3-phase power in balanced and unbalanced load condition, 3 phase wattmeter.

UNIT-IV

Measurement of Resistance – Classification of resistance, measurement of low, medium, and high resistance, kelvin's double bridge, wheat-stone bridge, ammeter, voltmeter method and ohmmeter, multimeter, Megger, importance of earth resistance, Earth tester.

UNIT-V

A. C. Bridges – Measurement of inductance and capacitance by A.C. bridges, Maxwell, Anderson, Hays, D' Sauty and Wien's bridge.

References:

1. A course in electrical & electronic measuring instruments by A.K.Sawhney.
2. Digital Instrumentation by Bouwens.
3. Electrical & Electronic measurements. By W.H.Cooper.
4. Electrical measurements & measuring instruments. By J.B.Gupta.

DEE-304 [BASIC ELECTRICAL MATERIALS]

UNIT-I

D.C. Circuits -: Concept of charge, current, voltage, EMF, resistance, resistivity, Ohm's law KCL, KVL, series and parallel combination of resistances connection, star to delta and delta to star transformation.

UNIT II

A.C. Fundamentals -: Concept of inductance, capacitance, reactance, impedance, admittance, phase diagram of pure resistive, inductive and capacitive circuit, difference between AC and DC quantities, sinusoidal waveform, frequency, time period, instantaneous, maximum, average and RMS value, form factor.

UNIT-III

Magnetic Effect of Electric Current: Concept of lines of force, flux, MMF, reluctance, permeability, magnetic flux density, magnetic field intensity, aAnalogy of electric and magnetic circuit, units, Faraday's laws of electromagnetic induction, self and mutual induction, Lenz's laws, Fleming's left and right hand rule.

UNIT-IV

Heating Effect of Electric Current: Heat produced, work, power and energy, units.

Chemical Effect of Electric Current: Faradays laws of electrolysis, Primary & secondary cells.

UNIT-V

Electrical Engineering Materials: Definition of conductors, insulators and semiconductors. intrinsic and extrinsic semi conductor materials, properties and applications of conducting, semi-conducting and insulating materials, classification of insulating materials on the basis of temperature. B-H curve, soft and hard magnetic materials, different magnetic materials, properties and applications.

References:

1. 1 Basic Electrical Engineering By Nagrath Kathari
2. Electrical Engineering Materials By TTTI Madras.
3. Basic Electrical Engineering By Jain & Jain
4. Basic Electrical Engineering By V.K. Mehta

DEE-305 [BASIC ELECTRONICS]

UNIT-I

Semiconductor Devices: Diodes - formation of PN junction, forward biasing and reverse biasing of pn junction, construction, characteristics and application of different types of diodes, zener diode, Transistor - PNP/ NPN junction transistors, different configurations: CB, CE, CC. transistors characteristics, and applications, special semiconductor devices – construction, symbol and application of tunnel diode, photo diode, varactor FET, MOSFET, UJT.

UNIT –II

Rectifiers: Single phase, half wave, full wave and bridge types of rectifiers, calculation of output voltage, average and RMS values, ripple factor and rectification efficiency, filter, types of filters.

UNIT-III

Regulated Power Supply - Difference between linear and switch mode power supply, regulated power supply and its limitations, series and shunt power supply using transistors, SMPS (Block diagram only), IC regulated power supply (78XX and 79XX series).

UNIT-IV

Amplifiers - Principle of amplification, types of transistor amplifiers, biasing techniques, RC coupled, transformer coupled, and direct coupled amplifiers, push pull Amplifier, working principle and applications, advantages and disadvantages, operational amplifier as comparator, multiplier, summer, integrator and differentiator.

UNIT- V

Oscillators – Principle of oscillation, types of oscillators such as Hartley, Colpitts, tuned oscillator, Wein bridge oscillator, circuit diagram, principle, working & applications.

References:

1. Basic Electronics & Linear Circuits- : By Bhargawa , T.T.T.I. Chandigarh .
2. Basic Electronics -: By V.K. Mehta
3. Electronics Principles - : By Mehta.
4. Digital Electronics -: By Mahino & Leach .
5. Electronics Devices & Circuits -: By G.K. Mithal. Work shop technology vol. I Raghuvanshi
6. Work shop technology vol. I Chapman
7. Workshop Vol. I P.N.Vijayvargiya (Hindi medium)

List of Experiments:

1. Characteristics of Germanium and Silicon Diode.
2. Characteristics of Zener Diode
3. Input and Output characteristics of Common Emitter BJT
4. Diode rectifier circuits (HWR and FWR), without and with C – type filter.
5. Diode Clipping and Clamping circuits.
6. Single stage CE Small Signal Amplifier. (With un- bypassed & bypassed RE)
7. BJT CE switch application.
8. UJT characteristics and UJT Relaxation Oscillator circuit.
9. Zener Diode voltage regulator.S