

EL- 803: Electrical Technology

Unit-1 (P-12)
DC Machines Basics: Basic constructional features and physical principles involved in electrical machines, armature winding (ac and dc), lap and wave connections , Coil Span, Commutation Pitch, Resultant Pitch, commutator, equalizer rings.
D.C. Generators: Construction and principles of operation, , Brief ideas about armature reaction and commutation , E.M.F. Equation, Methods of excitation, Characteristics of Self excited and Separately (Shunt, Compound and Series) excited generators (1), Losses and efficiency, applications.
D.C. Motors: Comparison of generator and motor action, Significance of back EMF, Maximum power, Torque and speed relation, Characteristics of series, shunt and Compound excited, necessity of motor starters, Three point starter, Speed control using SCR.

Unit-2 (P-12)
Transformers: Types of transformers, Transformer Construction, E.m.f. equation, No load operation, Operation under load, Phasor diagram, Transformer Losses, Voltage regulation, condition for maximum efficiency, All day efficiency, Short circuit and open circuit tests, Auto transformers.
Polyphase Circuits: Polyphase circuits, three phase transformers, delta-delta and delta –Y connection, Rectifier using SCR, Chopper, Inverter.

Unit-3 (P-12)
Poly Phase Induction Motors: General constructional features, Types of rotors, Rotating magnetic field (Ferrari's Principle), Production of torque, Slip, Torque equation, Torque-slip characteristics, Speed control of Induction motor.

Unit-4 (P-12)
Synchronous Machines: Brief construction details of three phase synchronous generators, E.M.F. equation, Principle of operation of synchronous motor.
Single Phase Induction Motors: Construction, principle of operation based on starting methods, Split phase Motors - capacitor motors, Equivalent circuit, Reluctance Motor, Stepper Motor, Single phase a.c. series motors, Universal motor.

Essential Texts

UNIT1

Chapters 1, 4, 5, 6, 7 , 12- I. J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill (1997), 4th ed.

Chapters 25, 26, 27, 28, 29, 30- B. L. Thareja and A. K. Thareja, Electrical Technology, S. Chand & Sons., 23rd Edition.

UNIT 2

Chapters 3- I. J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill (1997), 4th ed. Chapters 19, 2- B. L. Thareja and A. K. Thareja, Electrical Technology, S. Chand & Sons., 23rd Edition. UNIT 3

Chapters 5, 9 - I. J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill (1997),4th ed.

Chapter 3 4 - B. L. Thareja and A. K. Thareja, Electrical Technology, S. Chand & Sons, 23rd Edition.

UNIT 4

Chapters 8, 10, 12- I. J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill (1997),4th ed. 43

Chapters 36,37,38,39- B. L. Thareja and A. K. Thareja, Electrical Technology, S. Chand & Sons., 23rd Edition.

Suggested Books:

1. G. Mc. Pherson, An introduction to Electrical Machines & Transformers, John Wiley & Sons (1990)
2. H. Cotton, Advanced Electrical Technology, CBS Publishers and Distributors, New Delhi (1984)
3. S. Ghose, Electrical Machines, Pearson Education (2005)
4. N. K. De and P. K. De, Electric Drives, Prentice Hall of India (1999)

Practicals –Electrical Technology

1. To study the characteristics of DC Series motor .
2. To study the characteristics of DC Shunt motor.
3. To study characteristics of single phase induction motor.
4. To study control of DC motor by SCR.
5. To Study Stepper Motor.
6. To Study Open Circuit Test on single phase transformer.
7. To Study Short Circuit Test on single phase transformer.