

AMEE07 ELECTROMECHANICAL ENERGY CONVERSION-I

UNIT-1 PRINCIPLES OF ELECTRO-MECHANICAL ENERGY CONVERSION

- 1.1 Introduction,
- 1.2 Flow of Energy in Electromechanical Devices,
- 1.3 Energy in magnetic systems(defining energy & Co-energy) ,
- 1.4 Singly Excited Systems; determination of mechanical force,
- 1.5 Mechanical energy, torque equation,
- 1.6 Doubly excited Systems;
- 1.7 Energy stored in magnetic field, electromagnetic torque,
- 1.8 Generated emf in machines; torque in machines with cylindrical air gap.

UNIT-2 D.C. MACHINES CONSTRUCTION OF DC MACHINES

- 2.1 Armature winding,
- 2.2 Emf and torque equation,
- 2.3 Armature Reaction ,Commutation ,
- 2.4 Interpol's and Compensating Windings,
- 2.5 Performance Characteristics of D.C. generators.

UNIT-3 D.C. MACHINES (CONTD.)

- 3.1 Performance Characteristics of D.C. motors,
- 3.2 Starting of D.C. motors; 3point and 4 point starters, Speed control of D.C. motors:
- 3.3 Field Control, armature control and Voltage Control (Ward Lenonard method);
- 3.4 Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test).

UNIT-4 SINGLE PHASE TRANSFORMER

- 4.1 Phasor diagram, efficiency and voltage regulation, all day efficiency.
- 4.2 Testing of Transformers: O.C. and S.C. tests, Sumpner;s test, polarity test.
- 4.3 Auto Transformer: Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications.

UNIT-5 THREE PHASE TRANSFORMERS

- 5.1 Construction, three phase transformer phasor groups and their connections,
- 5.2 Open delta connection, three phase to 2 phase, 6 phase or 12 phase connections, and their applications,
- 5.3 Parallel operation and load sharing of single phase and three phase transformers,
- 5.4 Excitation phenomenon and harmonics in transformers, three winding transformers.

Reference Books:

1. Irving L. Kosow, "Electric Machine and Transformers", Prentice Hall of India.
2. M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
3. Bhag S. Guru and Huseyin R. Hizirogulu, "Electric Machinery and Transformers" Oxford University Press, 2001.