

AMEI-26 ELECTRICAL MACHINE

UNIT-1 PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSION.

- 1.1 DC machines: construction, armature windings, induced EMF equation, torque production, magnetization curve.
- 1.2 Types of generators and motors, characteristics, commutation and interpoles, armature reaction, Speed control of dc motor and starting.
- 1.3 PMDC machine: Introduction and need of brushless motors.

UNIT-2 TRANSFORMERS

- 2.1 Construction, ideal and practical transformer, equivalent circuits, voltage regulation, maximum efficiency criterion.
- 2.2 Open circuit and short circuit tests. Phasor diagrams on no load, full load, lagging and leading power factor loads.
- 2.3 Three phase transformer.
- 2.4 Introduction to polyphase induction machines, production of rotating magnetic flux vector,
- 2.5 Principle of operation, importance of air gap, comparison with transformer, types of rotor.

UNIT-3 INDUCTION MOTORS

- 3.1 Development of an equivalent circuit, estimation of parameters, no load and block rotor tests.
- 3.2 Torque slip characteristics, starting of induction motors methods, deep bar and double cage rotor, power relations, speed control of induction motors.
- 3.3 Single phase induction motor, double field revolving theory, starting methods of single phase induction motors, universal motor and introduction to switched reluctance motor.

UNIT-4 SYNCHRONOUS MACHINE

- 4.1 Construction, pitch factor and distribution factor, induced emf equation, equivalent circuits and phasor diagrams, power relations,
- 4.2 OCC and SCC characteristics for voltage regulation of alternator, salient pole and cylindrical rotor machines and phasors.
- 4.3 Effect of excitation and V curves.
- 4.4 Power factor correction and parallel operation of synchronous generator.

Reference Books:

1. M. V. Deshpande, "Electrical Machines" PHI
2. PC Sen, "Principles of Electric Machinery and Power Electronics", Wiley and Sons, Third Edition.
3. Ashfaq Hussain, "Electrical Machines", Dhanpat Rai