

Alternating Current Machines — R. K. Rajput (2002) — Table of Contents (Pertinent Summary)

Part I — Introduction / Foundational Concepts 1. Electromechanical Energy Conversion • Fundamental principles of energy conversion between electrical & mechanical systems. 2. Polyphase Circuits • Analysis of three-phase systems, phasors, balance/unbalance, power measurement.

Part II — Alternating Current Machines

Transformers 3. Transformers • Construction, working principles, equivalent circuits, performance, losses and efficiency.

Induction Machines 4. Polyphase Induction Motors • Squirrel-cage and wound-rotor types; torque-speed characteristics; equivalent circuits; performance. 5. Single-Phase Motors • Types (split-phase, capacitor start/run, shaded-pole, etc.), working principles and applications.

Synchronous Machines 6. Synchronous Generators (Alternators) • Construction, EMF equation, voltage regulation, operating characteristics. 7. Synchronous Motors • Principle of operation, starting methods, V-curve characteristics, applications.

Power Electronics & Conversion 8. Converters and Rectifiers • AC-DC conversion theory, controlled/uncontrolled rectifiers, performance parameters.

Additional Topics (Often Included) - Special types of A.C. and D.C. machines - Electronic control of motors - Digital control of electrical drives - Transient conditions in machines - Motor selection criteria for various applications - Energy conservation in electrical drives - Enclosures, ratings and practical considerations

Supplementary Materials - A question bank with objective/short questions - Solved examples and practice problems for each chapter - Highlights and summaries at the end of each chapter

Résumé des Sections Clés | Section | Focus | |-----|-----| | Polyphase Circuits | AC system fundamentals & three-phase analysis | | Transformers | Static AC energy transfer devices | | Induction Motors | Most common AC motors for industry | | Single-Phase Motors | Small machines & residential applications | | Synchronous Machines | Generators & motors running at synchronized speeds | | Converters/Rectifiers | Bridge between AC machines and power electronics |