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2/4 B.Tech - THIRD SEMESTER

EC3T5

Electrical Technology

Credits: 4

Lecture : 4 periods/week

Tutorial: 1 period /week

Internal assessment: 30 marks

Semester end examination: 70 marks -----

Course Objectives:

- To Understand Principle of operation of AC and DC machines
- To study the Testing and performance of AC and DC machines
- To analyse the Measurement of basic electrical quantities
- To Study Different types of instruments for measuring AC and DC quantities
- To Know the Performance of Photovoltaic cells

Learning Outcomes:

Based upon the above objectives the learning outcomes are

- understand the principle of operation of AC and DC machines
- know the testing of AC , DC machines and transformers
- evaluate the measurement of basic electrical quantities
- Be familiar with the performance of photovoltaic cells

UNIT- I

DC Generators: Construction and principle of operation of DC Generator- EMF equation – Types of generators – Magnetization and load characteristics of DC generators

UNIT- II

D.C. Motors: DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT- III

Transformers: Construction and principle of operation of single phase transformer – Phasor diagram on No Load and Load – Equivalent circuit, construction of three phase transformer and operation

UNIT- IV

Performance of Single Phase Transformers: Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT- V

Three Phase Induction Motor: Construction and principle of operation of three-phase induction motors – Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

UNIT- VI

Three Phase Alternators: Alternators – Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors –Determination of Regulation of alternator by synchronous impedance method

UNIT- VII

Single Phase Induction Motors: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics. Universal motor, permanent magnet DC motor

UNIT- VIII

Electrical Instruments: Basic Principles of indicating instruments – Moving Coil, Moving iron Instruments (Ammeters and Voltmeters) and dynamometer type wattmeter.

Photovoltaic energy : Solar photovoltaic energy basics and performance calculations

Learning Resources

Text Books:

1. Principles of Electrical Engineering, V.K. Mehta and Rohit Mehta, 1st edition, 2012
2. Basic Electrical Engineering , Nagsarkar,Sukhija, Oxford Publications,2nd edition, 2009
3. Science & Technology of Photovoltaics, P. Jaya Ram Reddy, BS Publications, 2004.

References:

1. Basic Electrical Engineering , M.S.Naidu and S.Kamakshiah,TMH Publications, 1st Edition, 2009
2. Fundamentals of Electrical Engineering , Rajendra Prasad, PHI Publications, 2rd Edition, 2009