ACADEMIC SESSION: 2025-26

Discipline: Electrical engineering	**Semester : 5th**	**Name of the Teaching Faculty : Kiran Kumar Bhoi**
Subject : Energy Conversion-2	No. of days / week class allotted	Semester From date: 04/07/2025 to 15/11/2025 Nos. of Weeks per semester: 15
Week	**Class Day**	**Theory Topics**
1ST	1st	Types of alternator and their constructional features
	2nd	Basic working principle of alternator and the relation between speed and frequency.
	3rd	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4th	Explain harmonics, its causes and impact on winding factor.
2ND	1st	E.M.F equation of alternator. (Solve numerical problems).
	2nd	Explain Armature reaction and its effect on emf at different power factor of load.
	3rd	The vector diagram of loaded alternator.
	4th	(Solve numerical problems) vector diagram
3RD	1st	Testing of alternator -Open circuit test, Short circuit test
	2nd	Testing of alternator (Solve numerical problems)
	3rd	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	4th	Parallel operation of alternator using synchro-scope and dark & bright lamp method.
4TH	1st	Explain distribution of load by parallel connected alternators.
	2nd	Constructional feature of Synchronous Motor.
	3rd	Principles of operation, concept of load angle
	4th	Derive torque, power developed.
5TH	1st	Effect of varying load with constant excitation.
	2nd	Effect of varying excitation with constant load.
	3rd	Power angle characteristics of cylindrical rotor motor.
	4th	Explain effect of excitation on Armature current and power factor.

6TH	1st	Hunting in Synchronous Motor.
	2nd	Function of Damper Bars in synchronous motor and generator.
	3rd	Describe method of starting of Synchronous motor.
	4th	State application of synchronous motor.
7TH	1st	Production of rotating magnetic field.
	2nd	Constructional feature of Squirrel cage and Slip ring induction motors.
	3rd	Working principles of operation of 3-phase Induction motor
	4th	Define slip speed, slip and establish the relation of slip with rotor quantities.
8TH	1st	Derive expression for torque during starting and running conditions and derive conditions for maximum torque
	2nd	(solve numerical problems)
	3rd	Torque-slip characteristics.
	4th	Derive relation between full load torque and starting torque etc
9TH	1st	(solve numerical problems)
	2nd	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss.
	3rd	solve numerical problems
	4th	Methods of starting and different types of starters used for three phase Induction motor part 1
10TH	1st	Methods of starting and different types of starters used for three phase Induction motor part 2
	2nd	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods.
	3rd	Plugging as applicable to three phase induction motor
	4th	Describe different types of motor enclosures.
11TH	1st	Explain principle of Induction Generator and state its applications.
	2nd	Explain Ferrari's principle.
	3rd	Explain double revolving field theory and Cross-field theory to analyze starting torque of 1 -phase induction motor.

11TH	4th	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors, Split phase motor, Capacitor Start motor.
12th	1st	Capacitor start, capacitor run motor, Permanent capacitor type motor, Shaded pole motor.
	2nd	Explain the method to change the direction of rotation of above motors.
	3rd	Construction, working principle, running characteristic and application of single phase series motor.
	4th	Construction, working principle and application of Universal motors.
13th	1st	Working principle of Repulsion start Motor, Repulsion start Induction run motor
	2nd	Working principle of Repulsion Induction motor.
	3rd	Principle of Stepper motor.
	4th	Classification of Stepper motor
14th	1st	Principle of variable reluctant stepper motor.
	2nd	Principle of Permanent magnet stepper motor.
	3rd	Principle of hybrid stepper motor.
	4th	Applications of Stepper motor.
15th	1st	Explain Grouping of winding, Advantages.
	2nd	Explain parallel operation of the three phase transformers.
	3rd	Explain tap changer (On/Off load tap changing)
	4th	Maintenance Schedule of Power Transformers.

10.7.25

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