

Discipline: EE	Semester: 5th	Name of the Teaching Faculty: MANMATHA BEHERA
Subject: Energy Conversion-II	No. of Days/per week class allotted: 04	Semester From Date: 01-08-2023 To Date: 09-12-2023 No. of Weeks : 15
Week	Class Day	Theory Topics
1 st	01	ALTERNATOR: Types of alternator and their constructional features
	02	Basic working principle of alternator and the relation between speed and frequency.
	03	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	04	Explain harmonics, its causes and impact on winding factor
2 nd	01	E.M.F equation of alternator.
	02	Solve numerical problems related to E.M.F equation of alternator.
	03	Explain Armature reaction and its effect on emf at different power factor of load.
	04	The vector diagram of loaded alternator
3 rd	01	Testing of alternator (Open circuit test and Short circuit test)
	02	Solve numerical problems related to The vector diagram of loaded alternator and Testing of alternator (Open circuit test and Short circuit test)
	03	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method.
	04	Solve numerical problems related to determination of voltage regulation of Alternator by direct loading and synchronous impedance method
4 th	01	Parallel operation of alternator using synchro-scope and dark & bright lamp method.
	02	Explain distribution of load by parallel connected alternators.
	03	THREE PHASE INDUCTION MOTOR: Production of rotating magnetic field
	04	Constructional feature of Squirrel cage and Slip ring induction motors
5 th	01	Working principles of operation of 3-phase Induction motor, define slip speed, slip and establish the relation of slip with rotor quantities
	02	Derive expression for torque during starting and

		running conditions and derive conditions for maximum torque
	03	solve numerical problems
	04	Torque-slip characteristics, Derive relation between full load torque and starting torque etc
6 th	01	Solve numerical problems
	02	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss
	03	Solve numerical problems
	04	Methods of starting and different types of starters used for three phase Induction motor
7 th	01	Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods
	02	Plugging as applicable to three phase induction motor
	03	Describe different types of motor enclosures
	04	Explain principle of Induction Generator and state its applications
8 th	01	SYNCHRONOUS MOTOR: Constructional feature of Synchronous Motor, Principles of operation, concept of load angle
	02	Derive torque, power developed
	03	Effect of varying load with constant excitation, Effect of varying excitation with constant load
	04	Power angle characteristics of cylindrical rotor motor
9 th	01	Explain effect of excitation on Armature current and power factor
	02	Hunting in Synchronous Motor
	03	Function of Damper Bars in synchronous motor and generator
	04	Describe method of starting of Synchronous motor, State application of synchronous motor
10 th	01	SINGLE PHASE INDUCTION MOTOR: Explain Ferrari's principle
	02	Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor
	03	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors i. Split phase motor
	04	ii. Capacitor Start motor
11 th	01	iii. Capacitor start, capacitor run motor
	02	iv. Permanent capacitor type motor
	03	v. Shaded pole motor

	04	Explain the method to change the direction of rotation of above motors
12 th	01	COMMUTATOR MOTORS: Construction and working principle of single phase series motor
	02	Running characteristic and application of single phase series motor
	03	Construction, working principle and application of Universal motors
	04	Working principle of Repulsion start Motor
13 th	01	Working principle of Repulsion start Induction run motor
	02	Working principle of Repulsion Induction motor.
	03	SPECIAL ELECTRICAL MACHINE: Principle of Stepper motor, Classification of Stepper motor.
	04	Principle of variable reluctant stepper motor
14 th	01	Principle of Permanent magnet stepper motor
	02	Principle of hybrid stepper motor, Applications of Stepper motor
	03	THREE PHASE TRANSFORMERS: Explain Grouping of winding, Advantages
	04	Explain parallel operation of the three phase transformers
15 th	01	Explain tap changer (On/Off load tap changing)
	02	Maintenance Schedule of Power Transformers
	03	Revision
	04	Revision