GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING

Department of Electrical Engineering

Lesson Plan

Subject : **ENERGY CONVERSION-II**			
Discipline: **Electrical Engineering**		Name of the Faculty: **Er. Mahesh Kumar Mishra**	
Course Code:	**TH-2**	Semester:	**5th**
Total Periods:	**60**	Examination:	**2022(Winter)**
Theory Periods:	4P/W	Class Test:	20
Maximum Marks:	**100**	End Semester Examination:	80

Week	Periods in week	Theory Topics
1st	**1st**	**ALTERNATOR:** Types of alternator and their constructional features.
	2nd	Basic working principle of alternator and the relation between speed andfrequency
	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	Explain Armature reaction and its effect on emf at different power factor ofload.
	4th	The vector diagram of loaded alternator. (Solve numerical problems)
3rd	**1st**	Testing of alternator (Solve numerical problems)Open circuit test.
	2nd	Short circuit test
	3rd	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	4th	(Solve numerical problems)
4th	**1st**	Parallel operation of alternator using synchro-scope and dark & brightlamp method.
	2nd	Explain distribution of load by parallel connected alternators
	3rd	SYNCHRONOUS MOTOR: Constructional feature of Synchronous Motor.
	4th	Principles of operation, concept of load angleDerive 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. Function of Damper Bars in synchronous motor and generator.
	2nd	Describe method of starting of Synchronous motor.State application of synchronous motor.
	3rd	COMMUTATOR MOTORS: Construction, working principle,
	4th	Running characteristic and application of single phase series motor.

7th	1st	Construction, working principle and application of Universal motors.
	2nd	Working principle of Repulsion start Motor,
	3rd	Repulsion start Induction run motor,
	4th	Repulsion Induction motor.
8th	1st	SPECIAL ELECTRICAL MACHINE: Principle of Stepper motor.
	2nd	Classification of Stepper motor.
	3rd	Principle of variable reluctant stepper motor
	4th	Principle of Permanent magnet stepper motor
9th	1st	Principle of hybrid stepper motor. Applications of Stepper motor.
	2nd	**THREE PHASE TRANSFORMERS:** Explain Grouping of winding, Advantages.
	3rd	Explain parallel operation of the three phase transformers.
	4th	Explain changer (On/Off load tap changing) tap
10th	1st	Explain changer (On/Off load tap changing) tap
	2nd	Maintenance Schedule of Power Transformers
	3rd	SINGLE PHASE INDUCTION MOTOR Explain Ferrari's principle
	4th	Explain double revolving field theory and Cross-field theory to analyzestarting torque of 1-phase induction motor.
11th	1st	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. Split phase motor.
	2nd	Capacitor Start motor.
	3rd	Capacitor start, capacitor run motor.
	4th	Permanent capacitor type motor.
12th	1st	Shaded pole motor
	2nd	Explain the method to change the direction of rotation of abovemotors.
	3rd	THREE PHASE INDUCTION MOTOR: Production of rotating magnetic field.
	4th	Constructional feature of Squirrel cage and Slip ring induction motors.
13th	1st	Working principles of operation of 3-phase Induction motor.
	2nd	Define slip speed, slip and establish the relation of slip with rotorquantities.
	3rd	Derive expression for torque during starting and running conditions andderive conditions for maximum torque. (solve numerical problems)
	4th	Torque-slip characteristics.
14th	1st	Derive relation between full load torque and starting torque etc. (solvenumerical problems)
	2nd	Establish the relations between Rotor Copper loss, Rotor output andGross 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 phaseInduction motor
15th	1st	Explain speed control by Voltage Control, Rotor resistance control, Polechanging, frequency control methods.
	2nd	Plugging as applicable to three phase induction motor.
	3rd	Describe different types of motor enclosures.
	4th	Explain principle of Induction Generator and state its applications.