

# Lesson Plan of Energy Conversion-II

Discipline:- Electrical	Semester:- 5th	Name Of The Teaching Faculty:- Manmohan Panda
Subject:- Energy Conversion-II	No Of Days Per week Class Allotted:-4	No Of Weeks:-15
No. of week	No. of class	Topic to be taught
1 <sup>st</sup>	1	<b>ALTERNATOR:</b> Types of alternator and their constructional features
	2	Basic working principle of alternator and the relation between speed and frequency
	3	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor)
	4	Explain harmonics, its causes and impact on winding factor
2 <sup>nd</sup>	5	E.M.F equation of alternator with numerical problems
	6	Explain Armature reaction and its effect on emf at different power factor of load
	7	The vector diagram of loaded alternator with Numerical Solving
	8	Testing of alternator Open circuit test with Numerical Solving
3 <sup>rd</sup>	9	Testing of alternator Short circuit test with Numerical Solving
	10	Determination of voltage regulation of Alternator by direct loading and Synchronous impedance method
	11	Numerical problems on Voltage regulation of Alternators
	12	Parallel operation of alternator using Synchro-scope
4 <sup>th</sup>	13	Parallel operation of alternator by dark & bright lamp method
	14	Explain distribution of load by parallel connected alternators
	15	<b>SYNCHRONOUS MOTOR:</b> Constructional feature of Synchronous Motor Principles of operation, concept of load angle
5 <sup>th</sup>	16	Derive torque, power developed
	17	Effect of varying load with constant excitation Effect of varying excitation with constant load
	18	Power angle characteristics of cylindrical rotor motor
	19	Explain effect of excitation on Armature current and power factor
6 <sup>th</sup>	20	Hunting in Synchronous Motor Function of Damper Bars in synchronous motor and generator
	21	Describe method of starting of Synchronous motor

# Lesson Plan of Energy Conversion-II

	22	State application of synchronous motor
	23	<b>THREE PHASE INDUCTION MOTOR:</b> Production of rotating magnetic field
	24	Constructional feature of Squirrel cage and Slip ring induction motors
7 <sup>th</sup>	25	Working principles of operation of 3-phase Induction motor Define slip speed, slip and establish the relation of slip with rotor quantities
	26	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	27	Torque-slip characteristics
	28	Derive relation between full load torque and starting torque etc. (solve numerical problems)
8 <sup>th</sup>	29	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss
	30	Related Numerical problems
	31	Methods of starting and different types of starters used for three phase Induction motor
	32	Explain speed control by Voltage Control, Rotor resistance control
9 <sup>th</sup>	33	Explain speed control by Pole changing, frequency control methods
	34	Plugging as applicable to three phase induction motor.
	35	Describe different types of motor enclosures
	36	Explain principle of Induction Generator and state its applications
10 <sup>th</sup>	37	<b>SINGLE PHASE INDUCTION MOTOR:</b> Explain Ferrari's principle
	38	Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor
	39	Explain Working principle, Torque speed characteristics, performance characteristics and application of Split phase motor
	40	Explain Working principle, Torque speed characteristics, performance characteristics and application of Capacitor Start motor
11 <sup>th</sup>	41	Explain Working principle, Torque speed characteristics, performance characteristics and application of Capacitor start, capacitor run motor

# Lesson Plan of Energy Conversion-II

	42	Explain Working principle, Torque speed characteristics, performance characteristics and application of Permanent capacitor type motor
	43	Explain Working principle, Torque speed characteristics, performance characteristics and application of Shaded pole motor
	44	Explain the method to change the direction of rotation of above motors
12 <sup>th</sup>	45	<b>COMMUTATOR MOTORS:</b> Construction & working principle of single phase series motor
	46	Running characteristic & application of single phase series motor
	47	Construction, Working principle and application of Universal motors
	48	Working principle of Repulsion start Motor
13 <sup>th</sup>	49	Working principle of Repulsion start Induction run motor
	50	Working principle of Repulsion Induction motor
	51	<b>SPECIAL ELECTRICAL MACHINE:</b> Principle & Classification of Stepper motor
14 <sup>th</sup>	52	Principle of variable reluctance stepper motor
	53	Principle of Permanent magnet stepper motor
	54	Principle of hybrid stepper motor
	55	Applications of Stepper motor
	56	<b>THREE PHASE TRANSFORMERS:</b> Explain Grouping of winding, Advantages
15 <sup>th</sup>	57	Explain parallel operation of the three phase transformers
	58	Explain On load tap changer in transformer
	59	Explain Off load tap changer in transformer
	60	Maintenance Schedule of Power Transformers

M.M. Panda  
27/09/2022  
Teaching Faculty

  
H.O.D E.E

Academic  
Coordinator

  
27/9/22  
PRINCIPAL

GOVT. POLYTECHNIC, DHENKANAL