

## ACADEMIC SESSION : 2023-24(Winter)

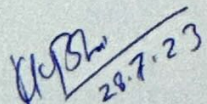
<b>Discipline : Electrical engineering</b>	<b>Semester : 5th</b>	<b>Name of the Teaching Faculty : Kiran Kumar Bhoi</b>
<b>Subject : Energy Conversion-2</b>	<b>No. of days / week class allotted</b>	Semester From date: : 01/08/2023 to 30/11/2023  Nos. of Weeks per semester : 15
<b>Week</b>	<b>Class Day</b>	<b>Theory Topics</b>
1 <sup>ST</sup>	1 <sup>st</sup>	Types of alternator and their constructional features
	2 <sup>nd</sup>	Basic working principle of alternator and the relation between speed and frequency.
	3 <sup>rd</sup>	Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor).
	4 <sup>th</sup>	Explain harmonics, its causes and impact on winding factor.
2 <sup>ND</sup>	1 <sup>st</sup>	E.M.F equation of alternator. (Solve numerical problems).
	2 <sup>nd</sup>	Explain Armature reaction and its effect on emf at different power factor of load.
	3 <sup>rd</sup>	The vector diagram of loaded alternator.
	4 <sup>th</sup>	(Solve numerical problems) vector diagram
3 <sup>RD</sup>	1 <sup>st</sup>	Testing of alternator -Open circuit test, Short circuit test
	2 <sup>nd</sup>	Testing of alternator (Solve numerical problems)
	3 <sup>rd</sup>	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	4 <sup>th</sup>	Parallel operation of alternator using synchro-scope and dark & bright lamp method.
4 <sup>TH</sup>	1 <sup>st</sup>	Explain distribution of load by parallel connected alternators.
	2 <sup>nd</sup>	Constructional feature of Synchronous Motor.
	3 <sup>rd</sup>	Principles of operation, concept of load angle
	4 <sup>th</sup>	Derive torque, power developed.
5 <sup>TH</sup>	1 <sup>st</sup>	Effect of varying load with constant excitation.
	2 <sup>nd</sup>	Effect of varying excitation with constant load.
	3 <sup>rd</sup>	Power angle characteristics of cylindrical rotor motor.
	4 <sup>th</sup>	Explain effect of excitation on Armature current and power factor.

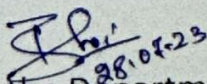


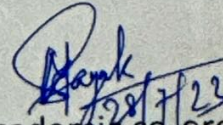
6 <sup>TH</sup>	1 <sup>st</sup>	Hunting in Synchronous Motor.
	2 <sup>nd</sup>	Function of Damper Bars in synchronous motor and generator.
	3 <sup>rd</sup>	Describe method of starting of Synchronous motor.
	4 <sup>th</sup>	State application of synchronous motor.
7 <sup>TH</sup>	1 <sup>st</sup>	Production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



	3 <sup>rd</sup>	Explain double revolving field theory and Cross-field theory to analyze starting torque of 1 -phase induction motor.
	4 <sup>th</sup>	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors, Split phase motor, Capacitor Start motor.0
12 <sup>th</sup>	1 <sup>st</sup>	Capacitor start, capacitor run motor, Permanent capacitor type motor, Shaded pole motor.
	2 <sup>nd</sup>	Explain the method to change the direction of rotation of above motors.
	3 <sup>rd</sup>	Construction, working principle, running characteristic and application of single phase series motor.
	4 <sup>th</sup>	Construction, working principle and application of Universal motors.
13 <sup>th</sup>	1 <sup>st</sup>	Working principle of Repulsion start Motor, Repulsion start Induction run motor
	2 <sup>nd</sup>	Working principle of Repulsion Induction motor.
	3 <sup>rd</sup>	Principle of Stepper motor.
	4 <sup>th</sup>	Classification of Stepper motor
14 <sup>th</sup>	1 <sup>st</sup>	Principle of variable reluctant stepper motor.
	2 <sup>nd</sup>	Principle of Permanent magnet stepper motor.
	3 <sup>rd</sup>	Principle of hybrid stepper motor.
	4 <sup>th</sup>	Applications of Stepper motor.
15 <sup>th</sup>	1 <sup>st</sup>	Explain Grouping of winding, Advantages.
	2 <sup>nd</sup>	Explain parallel operation of the three phase transformers.
	3 <sup>rd</sup>	Explain tap changer (On/Off load tap changing)
	4 <sup>th</sup>	Maintenance Schedule of Power Transformers.

  
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