SYNERGY SCHOOL OF ENGINEERING, DHENKANAL
LESSION PLAN 2023-24

Discipline: ELECTRICAL ENGINEERING	Semester: 5TH	Name of the Teaching Faculty: SUNANDITA SAHOO
Subject: Th1. ENERGY CONVERSION – II	No. Of Days/ Per week Class Allotted: 04	Semester From Date: No. Ofweeks: 14
Week	Class Day	Topic to be taught (Theory)
1st	1	ALTERNATOR: Types of alternator and their constructional features
	2	Basic working principle of alternator and the relation between speed and frequency
	3	Basic working principle of alternator and the relation between speed and frequency
	4	Terminology in armature winding and expressions for winding factors
2nd	5	Explain harmonics, its causes and impact on winding factor
	6	E.M.F equation of alternator. (Solve numerical problems).
	7	Solve numerical problems Explain Armature reaction and its effect on emf at different power factor of load
	8	The vector diagram of loaded alternator. (Solve numerical problems)
3rd	9	Testing of alternator (Solve numerical problems)
	10	Open circuit test. Short circuit test.
	11	Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems)
	12	

		Parallel operation of alternator using synchro-scope and dark & bright lamp method .
4th	13	Parallel operation of alternator using synchro-scope and dark & bright lamp method .
	14	Explain distribution of load by parallel connected alternators .
	15	**2. SYNCHRONOUS MOTOR:** Constructional feature of Synchronous Motor. Principles of operation, concept of load angle.
	16	Derive torque, power developed. Effect of varying load with constant excitation.
5th	17	Effect of varying excitation with constant load. Power angle characteristics of cylindrical rotor motor .
	18	Explain effect of excitation on Armature current and power factor. Hunting in Synchronous Motor
	19	Function of Damper Bars in synchronous motor and generator.
	20	Describe method of starting of Synchronous motor.
6th	21	Describe method of starting of Synchronous motor.
	22	State application of synchronous motor.
	23	INDUCTION MOTOR: Production of rotating magnetic field.
	24	Constructional feature of Squirrel cage and Slip ring induction motors
7th	25	Working principles of operation of 3-phase Induction motor.
	26	Define slip speed, slip and establish the relation of slip with rotor quantities .
	27	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
	28	Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems)
8th	29	Torque-slip characteristics.

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9th	30	Derive relation between full load torque and starting torque etc. (solve numerical problem)
	31	Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems)
	32	Methods of starting and different types of starters used for three phase Induction motor
	33	Explain speed control by Voltage Control, Rotor resistance control, 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.
10th	36	**4. SINGLE PHASE INDUCTION MOTOR:** Explain Ferrari's principle.
	37	Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor.
	38	Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. 1. Split phase motor.
11th	39	2.Capacitor Start motor. 3. Capacitor start, capacitor run motor.
	40	Capacitor start, capacitor run motor
	41	4.Permanent capacitor type motor
	42	5. Shaded pole motor.
	43	Explain the method to change the direction of rotation of above motors
	44	**5. COMMUTATOR MOTORS:** Construction, working principle, running characteristic and application of single phase series motor
12th	45	running characteristic and application of single phase series motor
	46	Construction, working principle
	47	Application of Universal motors

	48	Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.
	49	Repulsion start Induction run motor
13th	50	Repulsion Induction motor
	51	**6. SPECIAL ELECTRICAL MACHINE:** Principle of Stepper motor. Classification of Stepper motor.
	52	Principle of variable reluctant stepper motor
	53	Principle of Permanent magnet stepper motor.
	54	Principle of hybrid stepper motor
	55	Applications of Stepper motor.
14th	56	**7. THREE PHASE TRANSFORMERS:** Explain Grouping of winding, Advantages .
	57	Explain parallel operation of the three phase transformer
	58	Explain tap changer (On/Off load tap changing)
	59	Maintenance Schedule of Power Transformers.
	60	**Doubt clear class**

30.07.2023

Subject Expert
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