LESSON PLAN FOR ENERGY CONVERSION – I (Th.-1)

Discipline: Electrical Engineering	**Semester: 4th**	**Name of the Teaching Faculty: CHANDRAMANI MAHAPATRA (Lect.)**
Subject: ENERGY CONVERSI-ON – I	**No. of days/ per week class allotted: 5**	**Semester From Date : 15/04/2021 to Date: 30/06/2021** **Required No. of Weeks: 15**
Week	**Class Day**	**Theory**
1st		**1. D.C GENERATOR**
	1st	1.1. Operating principle of generator
	2nd	1.2. Constructional features of DC machine. 1.2.1. Yoke, Pole & field winding, Armature, Commutator.
	3rd	1.2.2. Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch. 1.2.3. Simple Lap and wave winding, Dummy coils.
	4th	1.3. Different types of D.C. machines (Shunt, Series and Compound)
	5th	Tutorial
2nd	1st	1.4. Derivation of EMF equation of DC generators.
	2nd	1.4. Derivation of EMF equation of DC generators. (Solve problems)
	3rd	1.5. Losses and efficiency of DC generator. Condition for maximum efficiency
	4th	1.5. Losses and efficiency of DC generator. Condition for maximum efficiency (solve numerical problems).
	5th	Tutorial
3rd	1st	1.6. Armature reaction in D.C. machine
	2nd	1.7. Commutation and methods of improving commutation.
	3rd	1.7.1. Role of inter poles and compensating winding in commutation.
	4th	1.8. Characteristics of D.C. Generators
	5th	Tutorial
4th	1st	1.9. Application of different types of D.C. Generators.
	2nd	1.10. Concept of critical resistance and critical speed of DC shunt generator
	3rd	1.11. Conditions of Build-up of emf of DC generator.
	4th	1.12. Parallel operation of D.C. Generators.
	5th	Tutorial
5th	1st	1.13. Uses of D.C generators.
		2. D. C. MOTORS
	2nd	2.1. Basic working principle of DC motor
	3rd	2.2. Significance of back emf in D.C. Motor.

	4th	2.3. Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
	5th	Tutorial
6th	1st	2.4. Derive torque equation (solve problems)
	2nd	2.5. Characteristics of shunt, series and compound motors and their application.
	3rd	2.6. Starting method of shunt, series and compound motors.
	4th	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method.
	5th	Tutorial
7th	1st	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. (Solve problems)
	2nd	2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	3rd	2.9. Determination of efficiency of D.C. Machine by Brake test method
	4th	2.9. Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
	5th	Tutorial
8th	1st	2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method
	2nd	2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems)
	3rd	2.11. Losses, efficiency and power stages of D.C. motor
	4th	2.11. Losses, efficiency and power stages of D.C. motor(solve numerical problems) 2.12. Uses of D.C. motors
	5th	Tutorial
		3. SINGLE PHASE TRANSFORMER
9th	1st	3.1 Working principle of transformer.
	2nd	3.2 Constructional feature of Transformer. 3.2.1 Arrangement of core & winding in different types of transformer.
	3rd	3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc. 3.2.3 Explain types of cooling methods
	4th	3.3 State the procedures for Care and maintenance.
	5th	Tutorial
10th	1st	3.4 EMF equation of transformer.
	2nd	3.5 Ideal transformer voltage transformation ratio
	3rd	3.6 Operation of Transformer at no load, on load with phasor diagrams.
	4th	3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer.
	5th	Tutorial
11th	1st	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.

	2nd	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load. (cont.)
	3rd	3.9 To explain Equivalent circuit and solve numerical problems.
	4th	3.9 To explain Equivalent circuit and solve numerical problems.
	5th	Tutorial
12th	1st	3.10 Approximate & exact voltage drop calculation of a Transformer.
	2nd	3.11 Regulation of transformer.
	3rd	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.
	4th	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
	5th	Tutorial
13th	1st	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency
	2nd	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	3rd	3.14 Explain All Day Efficiency (solve problems)
	4th	3.15 Determination of load corresponding to Maximum efficiency.
	5th	Tutorial (3.16 Parallel operation of single phase transformer.)
		4. AUTO TRANSFORMER
14th	1st	4.1. Constructional features of Auto transformer. 4.2. Working principle of single phase Auto Transformer.
	2nd	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper). 4.4. Uses of Auto transformer.
	3rd	4.5. Explain Tap changer with transformer (on load and off load condition)
		5. INSTRUMENT TRANSFORMERS
	4th	1.1 Explain Current Transformer and Potential Transformer
	5th	Tutorial
15th	1st	1.1 Explain Current Transformer and Potential Transformer
	2nd	1.2 Define Ratio error, Phase angle error, Burden.
	3rd	1.2 Define Ratio error, Phase angle error, Burden.
	4th	1.3 Uses of C.T. and P.T.
	5th	Tutorial