UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SUBJECT- Th1. ENERGY CONVERSION – I

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(Session: 2022-23)

Week	Topic to be covered
1	Operating principle of generator
	Constructional features of DC machine. Yoke, Pole & field winding, Armature, Commutator.
	Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	Simple Lap and wave winding, Dummy coils.
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2	Different types of D.C. machines (Shunt, Series and Compound)
	Derivation of EMF equation of DC generators. (Solve problems)
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	Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
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3	Armature reaction in D.C. machine
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	Commutation and methods of improving commutation.
	Role of inter poles and compensating winding in commutation.
	Characteristics of D.C. Generators, Application of different types of D.C. Generators.
4	Concept of critical resistance and critical speed of DC shunt generator
	Conditions of Build-up of emf of DC generator.
	Parallel operation of D.C. Generators. Uses of D.C generators.
	Class Test -01
	Basic working principle of DC motor, Significance of back emf in D.C. Motor.
	Derive torque equation (solve problems)

5	Derive torque equation (solve problems)
	Characteristics of shunt, series and compound motors and their application.
	Starting method of shunt, series and compound motors.
	Speed control of D.C shunt motors by Flux control method. Solve problems
6	Speed control of D.C shunt motors by Armature voltage Control method. Solve problems
	Speed control of D.C. series motors by Field Flux control method
	Speed control of D.C. series motors by Tapped field method and series-parallel method
	Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems)
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7	Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems)
	Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems)
	Losses, efficiency and power stages of D.C. motor(solve numerical problems) ,Uses of D.C. motors
	Losses, efficiency and power stages of D.C. motor(solve numerical problems) ,Uses of D.C. motors
	Class Test -02
8	Working principle of transformer.
	Constructional feature of Transformer.
	Arrangement of core & winding in different types of transformer.
	Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
	Explain types of cooling methods 3.3 State the procedures for Care and maintenance.
9	EMF equation of transformer.Ideal transformer voltage transformation ratio
	Operation of Transformer at no load, on load with phasor diagrams.
	Operation of Transformer at no load, on load with phasor diagrams.
	Equivalent Resistance, Leakage Reactance and Impedance of transformer.
	To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
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	To explain Equivalent circuit and solve numerical problems.
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	Approximate & exact voltage drop calculation of a Transformer.
	Regulation of transformer.
11	Different types of losses in a Transformer. Explain Open circuit test.(Solve numerical problems)
	Different types of losses in a Transformer. Explain Short Circuit test.(Solve numerical problems)
	Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	Explain All Day Efficiency (solve problems)
12	Determination of load corresponding to Maximum efficiency.
	Parallel operation of single phase transformer.
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	Class Test-03
	Constructional features of Auto transformer.
13	Working principle of single phase Auto Transformer.
	Comparison of Auto transformer with an two winding transformer (saving of Copper). Uses of Auto transformer.
	Class Test-04

	Explain Tap changer with transformer (on load and off load condition)
	Explain Current Transformer
14	Explain Potential Transformer
	Define Ratio error, Phase angle error, Burden.
	Uses of C.T. and P.T.
	Class Test-05
	Revision
15	Revision
	Revision
	Revision and previous year question discussion
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