

ENERGY CONVERSION-I (Th-01)

Date of Commencement of classes: 02.01.2024

Date of Closing of classes: 23.04.2024

CHAPTER-WISE DISTRIBUTION OF PERIODS

Sl. No.	Name of the Chapter	Periods as per Syllabus	Required periods	Expected Marks
01	DC. GENERATORS	17	22	30
02	D.C.MOTORS	15	20	25
03	SINGLE PHASE TRANSFORMER	20	17	25
04	AUTO TRANSFORMER	03	02	10
05	INSTRUMENT TRANSFORMERS	05	02	10
	TOTAL	60	63	100

LESSON PLAN

Class day	Art. No.	NAME OF THE FACULTY –PRANAY ROUT
		Theory Topics
1 st	1.1 1.2 1.2.1	Chapter-01 (D.C Generator) Operation Principle of generator Constructional features of D.C machine (Fig. detection of parts)
2 nd	1.2.1	Detection of rest of parts of the d.c generator
3 rd	1.2.2	Armature winding, Back, Front, Resultant & Commutator pitch
4 th	1.2.3	Simple Lap & wave winding with their properties.
1 st	1.4	Derive E.M.F equation of a d.c. generator (Solve problems)
2 nd	1.3	Different Types of D.C M/C a. Self-Excited with ckt. Diagram with voltage equation
3 rd		b. Separately Excited (Shunt & Series) with ckt. diagram & equations. C. Separately Excited (Long, short shunt & also the cumulative & differential compound M/C) with Ckt. Diagram & equations.
4 th		Numerical Problems
5 th	1.6	Explanation of Armature reaction in D.C M/C & It's remedies.
6 th	1.7	Commutation and methods of improving commutation a (Resistance Commutation))
	1.7.1	b. (Voltage Commutation) Explanation of Inter poles & Compensating windings
1 st	1.8	Characteristics Applications of D.C Generators: a. Internal Characteristic/OCC/LCC of shunt Generator & Application b. Internal Characteristic/OCC/LCC of Series Generator & Application
2 nd		c. Internal Characteristic/OCC/LCC of Compound Generator & Application
3 rd	1.10 1.11	Voltage built up & Critical resistance of a D.C shunt generator
1 st	1.5	Losses and efficiency in a d.c generator
2 nd		Power Stage diagram, Efficiency & condition for max Efficiency.
1 st		Numerical problems
2 nd		Numerical problems
3 rd	1.12	Parallel operation of D.C. Generators.
4 th		a. Definition of Parallel operation & it's condition b. Parallel operation of D.C. Shunt generator
5 th		c. Parallel operation of D.C. Series generator d.
1 st		Numerical problems
2 nd	1.9 1.13	Application of different types of D.C Generators, Uses of D.C generators

3 rd	2.1	Chapter-02 (D. C. MOTORS) Principle of D.C. Motor
4 th	2.2	Significance of back EMF, symbol, ckt diagram & voltage equation
1 st	2.3	Voltage Equation of Motor & Condition for maximum power developed.
2 nd	2.6	Types of D.C Motor Definition, Ckt diagram & voltage equation of separately excited & shunt & series motor b. Definition, Ckt diagram & voltage equation of compound motor
3 rd	2.4	Torque equation of D.C Motor (Gross & shaft torque)
4 th		Numerical problems
1 st	2.5	Characteristics of D.C. shunt Motors & Applications: a. Speed current Characteristic b. Torque –Current Characteristic c. Speed –Torque characteristic
2 nd		Characteristics of D.C. Series Motors & Applications: a. Speed current Characteristic b. Torque –Current Characteristic c. Speed –Torque characteristic
3 rd		Characteristics of D.C. Compound Motors & Applications: a. Speed current Characteristic b. Torque –Current Characteristic c. Speed –Torque characteristic
4 th		Numerical problems
5 th	2.6	Methods of starting of D.C. Motors (introduction) a. 3-point starter for starting shunt motor
6 th		b. 4-point starter for starting compound motor
1 st	2.7	Speed Control Of D.C Motors a. Speed Control of d.c. Shunt Motor by flux & armature control method
2 nd		Numerical problems
3 rd	2.8	b. Speed Control Of D.C series Motor by flux control, Tapped field & series -parallel method
4 th	2.9	Determination of efficiency of a d.c. Motor by break test method
5 th	2.10	Determination of efficiency of a d.c. Motor by Swinburne's test method
1 st		Numerical problems
2 nd	2.11	Losses & power stage diagram of D.C. Motor
3 rd	2.12	uses of d.c motors. & Numerical problems

4 th	3.1	Chapter-03(Single Phase Transformer) Introduction, Definition & working principle
	3.2 3.2.1	Constructional details: Different parts such as core, windings.
1 st	3.2.2	conservator, tank breather etc.
	3.2.3	Types of transformers
2 nd	3.3	Explain types of cooling methods State the procedure for care & Maintenance
3 rd	3.4	Derivation of EMF equation
4 th	3.5	Voltage transformation ratio of an ideal T/F
1 st		Explanation of an ideal T/F on no load with phasor diagram
		Numerical problems
2 nd	3.6	Phasor diagram of an Ideal T/F on load (UPF, Lagging & leading P.F)
3 rd	3.7	Explanation of equivalent resistance, reactance & impedance
4 th	3.8	Phasor diagram of practical T/F with winding resistance & magnetic leakage for u.p.f, lagging & leading p.f.
5 th	3.9	Equivalent circuit diagram
	3.10	Derivation of approximate & exact voltage drop of a T/F
1 st	3.11	Calculation of voltage regulation at different power factors
	3.12	Losses & efficiency of a 1-ph T/F
2 nd	3.13	Open circuit test & S.C test of a 1-ph T/F
1 st	3.15	condition for maximum of 1-ph T/F & load corresponding to max efficiency.
2 nd		Numerical problems
3 rd	3.14	Explanation of all day efficiency
1 st		Formula for o/p power & losses & numerical problems
2 nd	3.16	Parallel operation of 1-ph T/F
3 rd	4.1	Chapter-04 (Auto Transformer) Constructional feature auto transformer,
	4.2	Working principle of an auto transformer,
	4.3	Saving of copper in an auto T/F
4 th	4.4	Applications of an Auto T/F
	4.5	On-Load Tap changer of the T/F
		Off-Load Tap changer of the T/F
5 th	5.1	Chapter-05 (Instrument Transformers) Definition, Construction of CT, PT & Ratio Error
6 th	5.2	Phase angle Error & Burden.
	5.3	Application of CT & PT

Learning Resources:

Sl. No.	Name of the Book	Author Name	Publisher
01	Electrical technology vol-II	B.L. Thereja & A.K. Thereja	S.Chand
02	Electrical machine	V.K .Meheta	
03	Electrical technology	J.B.Gupta	

