

**ACADEMIC SESSION : 2023-24**

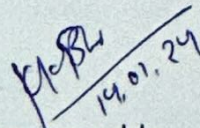
<b>Discipline: Electrical Engineering</b>	<b>Semester: 4th</b>	<b>Name of the Teaching Faculty: KIRAN KUMAR BHOI</b>
<b>Subject: ENERGY CONVERSION- I</b>	<b>No. of days / week class allotted</b>	<b>Semester From date: 16/01/2024 to 26/04/2024</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory/ Practical Topics</b>
<b>1<sup>ST</sup></b>	<b>1<sup>st</sup></b>	Operating principle of generator, Constructional features of DC machine.
	<b>2<sup>nd</sup></b>	Yoke, Pole & field winding, Armature, Commutator
	<b>3<sup>rd</sup></b>	Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch
	<b>4<sup>th</sup></b>	Simple Lap and wave winding, Dummy coils.
<b>2<sup>ND</sup></b>	<b>1<sup>st</sup></b>	Different types of D.C. machines (Shunt, Series and Compound)
	<b>2<sup>nd</sup></b>	Derivation of EMF equation of DC generators. (Solve problems)
	<b>3<sup>rd</sup></b>	Losses and efficiency of DC generator. Condition for maximum efficiency.
	<b>4<sup>th</sup></b>	numerical problems.
<b>3<sup>RD</sup></b>	<b>1<sup>st</sup></b>	Armature reaction in D.C. machine
	<b>2<sup>nd</sup></b>	Commutation and methods of improving commutation.
	<b>3<sup>rd</sup></b>	Role of inter poles and compensating winding in commutation
	<b>4<sup>th</sup></b>	Characteristics of D.C. Generators
<b>4<sup>TH</sup></b>	<b>1<sup>st</sup></b>	Application of different types of D.C. Generators
	<b>2<sup>nd</sup></b>	Concept of critical resistance and critical speed of DC shunt generator
	<b>3<sup>rd</sup></b>	Conditions of Build-up of emf of DC generator.
	<b>4<sup>th</sup></b>	Parallel operation of D.C. Generators.
<b>5<sup>TH</sup></b>	<b>1<sup>st</sup></b>	Uses of D.C generators.
	<b>2<sup>nd</sup></b>	Basic working principle of DC motor
	<b>3<sup>rd</sup></b>	Significance of back emf in D.C. Motor.
	<b>4<sup>th</sup></b>	Voltage equation of D.C. Motor and condition for maximum power output
<b>6<sup>TH</sup></b>	<b>1<sup>st</sup></b>	solve problems
	<b>2<sup>nd</sup></b>	Derive torque equation (solve problems)
	<b>3<sup>rd</sup></b>	Characteristics of shunt, series and compound motors and their application.

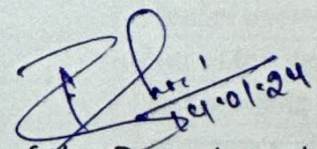


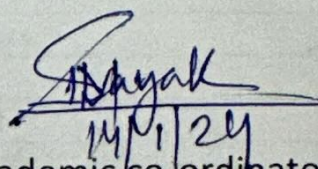
	4 <sup>th</sup>	Starting method of shunt, series and compound motors
7 <sup>TH</sup>	1 <sup>st</sup>	Speed control of D.C shunt motors by Flux control method. Armature voltage Control method.
	2 <sup>nd</sup>	Solve problems
	3 <sup>rd</sup>	Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	4 <sup>th</sup>	Determination of efficiency of D.C. Machine by Brake test method (solve numerical problems)
8 <sup>TH</sup>	1 <sup>st</sup>	Determination of efficiency of D.C. Machine by Swinburne's Test method (solve numerical problems)
	2 <sup>nd</sup>	Losses, efficiency and power stages of D.C. motor.
	3 <sup>rd</sup>	(Solve numerical problems)
	4 <sup>th</sup>	Uses of D.C. motors
9 <sup>TH</sup>	1 <sup>st</sup>	Working principle of transformer.
	2 <sup>nd</sup>	Constructional feature of Transformer, Arrangement of core & winding in different types of transformers.
	3 <sup>rd</sup>	Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc
	4 <sup>th</sup>	Explain types of cooling methods
10 <sup>TH</sup>	1 <sup>st</sup>	State the procedures for Care and maintenance.
	2 <sup>nd</sup>	EMF equation of transformer
	3 <sup>rd</sup>	Ideal transformer voltage transformation ratio
	4 <sup>th</sup>	Operation of Transformer at no load, on load with phasor diagrams
11 <sup>TH</sup>	1 <sup>st</sup>	Equivalent Resistance, Leakage Reactance and Impedance of transformer
	2 <sup>nd</sup>	To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
	3 <sup>rd</sup>	To explain Equivalent circuit and solve numerical problems
	4 <sup>th</sup>	Approximate & exact voltage drop calculation of a Transformer.
12 <sup>th</sup>	1 <sup>st</sup>	Regulation of transformer.
	2 <sup>nd</sup>	Different types of losses in a Transformer. Explain Open circuit and Short Circuit test. Solve numerical problems)
	3 <sup>rd</sup>	Solve numerical problems)



	4 <sup>th</sup>	Explain Efficiency, efficiency at different loads and power factors
13 <sup>th</sup>	1 <sup>st</sup>	condition for maximum efficiency (solve problems)
	2 <sup>nd</sup>	Explain All Day Efficiency (solve problems)
	3 <sup>rd</sup>	Determination of load corresponding to Maximum efficiency.
	4 <sup>th</sup>	6 Parallel operation of single-phase transformer.
14 <sup>th</sup>	1 <sup>st</sup>	Constructional features of Auto transformer
	2 <sup>nd</sup>	Working principle of single-phase Auto Transformer
	3 <sup>rd</sup>	Comparison of Auto transformer with a two-winding transformer (saving of copper)
	4 <sup>th</sup>	Uses of Auto transformer
15 <sup>th</sup>	1 <sup>st</sup>	Explain Tap changer with transformer (on load and off load condition)
	2 <sup>nd</sup>	Explain Current Transformer and Potential Transformer
	3 <sup>rd</sup>	Define Ratio error, Phase angle error, Burden.
	4 <sup>th</sup>	1.3 Uses of C.T. and P.T.

  
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