B.K.N. Govt. Polytechnic Narnaul Haryana

Electrical Engineering Department

Lesson Plan

Name of Faculty	**Sh. Sandeep Kumar**
Discipline	**Electrical Engineering**
Semester	**4th**
Subject	**Electrical Machine -I**
Lesson Plan Duration	**From March 2021 to July 2021**
Work load [Theory + Practical] Per Week	**[04+02]**

Week	Theory		Practical	
	Lecture Day	**Topic**	**Practical Day**	**Topic**
1st	**1st**	**Unit-1 Introduction to Electrical Machines** Definition of motor and generator, concept of torque	**1st**	**PRACTICAL-1** Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding
	2nd	Torque development due to alignment of two fields and the concept of torque angle		
	3rd	Electro-magnetically induced emf	**2nd**	**PRACTICAL-1** Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding
	4th	Elementary concept of an electrical machine		
2nd	**5th**	Comparison of generator and motor	**3rd**	**PRACTICAL-2** Speed control of dc shunt motor (i) Armature control method (ii) Field control method
	6th	Generalised theory of electrical machines		
	7th	REVISION UNIT-1	**4th**	**PRACTICAL-2** Speed control of dc shunt motor (i) Armature control method (ii) Field control method
	8th	REVISION UNIT-1		
3rd	**9th**	**Unit-2 DC Machines** Main constructional features, Types of armature winding	**5th**	**PRACTICAL-3** Study of dc series motor with starter (to operate the motor on no load for a moment)
	10th	Function of the commutator for motoring and generation action		

	11th	Factors determining induced emf	**6th**	**PRACTICAL-3** Study of dc series motor with starter (to operate the motor on no load for a moment)
	12th	Factors determining the electromagnetic torque		
4th	**13th**	Various types of DC generator	**7th**	**PRACTICAL-4** Determine efficiency of DC motor by Swinburne'sTest at (i)Rated capacity (ii)Half /Full load
	14th	Significance of back e.m.f., the relation between back emf and Terminal voltage		
	15th	Armature Reaction	**8th**	**PRACTICAL-4** Determine efficiency of DC motor by Swinburne'sTest at (i)Rated capacity (ii)Half/ Full load
	16th	Commutation methods to improve commutation		
5th	**17th**	Performance and characteristics of different types of DC motors	**9th**	**PRACTICAL-5** To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and (iii) efficiency of a transformer from the data obtained from open circuit and short circuit test at full load
	18th	Speed control of dc shunt/series motors		
	19th	Need of starter, three point dc shunt motor starter and 4-point starter	**10th**	**PRACTICAL-5** To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and (iii) efficiency of a transformer from the data obtained from open circuit and short circuit test at full load
	20th	Electric Braking &Applications of DC motors		
6th	**21st**	Faults in dc machines & their retrospective, Losses in a DC machine	**11th**	**PRACTICAL-6** To find the efficiency and regulation of single phase transformer by actually loading it.
	22nd	Determination of losses by Swinburne's test		
	23rd	Rating and Specifications of DC machines	**12th**	**PRACTICAL-6** To find the efficiency and regulation of single phase transformer by actually loading it.
	24th	REVISION UNIT-2		
7th	**25th**	REVISION UNIT-2	**13th**	**PRACTICAL-7** Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
	26th	REVISION UNIT-2		
	27th	REVISION UNIT-2		**PRACTICAL-7**

	28th	REVISION UNIT-2	**14th**	Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
8th	**29th**	**Unit-3 Transformers(Single phase)** Introduction	**15th**	**PRACTICAL-8** Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as Star-star Star delta Delta star Delta - Delta configuring conditions
	30th	Constructional features of a transformer and parts of transformer		
	31st	Working principle of a transformer	**16th**	**PRACTICAL-8** Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as Star-star Star delta Delta star Delta - Delta configuring conditions
	32nd	EMF equation		
9th	**33rd**	Transformer on no-load and its phasor diagram	**17th**	REVISION PRACTICAL-1
	34th	Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram		
	35th	Mutual and leakage fluxes, leakage reactance	**18th**	REVISION PRACTICAL-1
	36th	Transformer on load, voltage drops and its phasor diagram		
10th	**37th**	Equivalent circuit	**19th**	REVISION PRACTICAL-2
	38th	Relation between induced emf and terminal voltage, regulation of a transformer-mathematical relation		
	39th	Losses in a transformer	**20th**	REVISION PRACTICAL-2
	40th	Open circuit and short circuit test. Calculation of efficiency, condition for maximum efficiency-maintenance of Transformer, scheduled Maintenance		
11th	**41st**	Auto transformer construction, saving of copper, working and applications	**21st**	REVISION PRACTICAL-3
	42nd	Different types of transformers including dry type transformer		

	43rd	Rating and Specifications of Single Phase Transformer	**22nd**	REVISION PRACTICAL-3
	44th	REVISION UNIT-3		
12th	**45th**	REVISION UNIT-3	**23th**	REVISION PRACTICAL-4
	46th	REVISION UNIT-3		
	47th	REVISION UNIT-3	**24th**	REVISION PRACTICAL-4
	48th	REVISION UNIT-3		
13th	**49th**	**Unit-4 Transformers three phase** Construction of three phase transformers	**25th**	REVISION PRACTICAL-5
	50th	And accessories of transformers such as Conservator, breather(Brief idea)		
	51st	Buchholz Relay, Tap Changer (off load and on load) (Brief idea)	**26th**	REVISION PRACTICAL-5
	52nd	Types of three phase transformer i.e. delta-delta, delta-star, star-delta and star-star		
14th	**53rd**	Conditions for parallel operation (only conditions are to be studied)	**27th**	REVISION PRACTICAL-6
	54th	On load tap changer		
	55th	Difference between power and distribution transformer	**28th**	REVISION PRACTICAL-6
	56th	Cooling of transformer		
15th	**57th**	Rating and Specifications of Three Phase Transformers	**29th**	REVISION PRACTICAL-7&8
	58th	REVISION UNIT-4		
	59th	REVISION UNIT-4	**30th**	REVISION PRACTICAL-7&8
	60th	REVISION UNIT-4		