

Title: Electrical Machines and Power Utilization	Semester: IV
Course No: EOES-244	Credits : 3 (2+1)

Lesson Plan

Lecture No.	Topics to be covered	Book No.	Chapter No.	Article No.	Problem No.
1 – 4	Electromotive force, reluctance, laws of magnetic circuits, and determination of ampere – turns for series and parallel circuits.	1	6	6.21 – 6.27	6.13 to 6.17
5 – 6	Hysteresis and eddy current losses.	1	8	8.1 – 8.4, 24.34	
7 - 11	Transformer - working principle, construction of single phase transformer, EMF equation, Transformer on load, voltage regulation, power and energy efficiency, open circuit and short circuit tests.	1	30	30.1 – 30.10, 30.19 – 30.24, 30.29,30.30, 30.32.	30.1 to 30.4
12 – 29	Principles, operation and performance of DC machine (generator and motor), EMF and torque equations, armature reaction, commutation, excitation of DC generator and their characteristics, starting of shunt and series motor, starters, speed control methods- field and armature control.	1	24 25 26 27 28	24.1 – 24.13, 24.30 – 24.38, 25.1 – 25.4, 25.7 – 25.12 26.1- 26.3 26.10 , 27.1-27.4 27.12 – 27.17, 28.1 – 28.3, 28.19 – 28.22	24.3 to 24.5 24.8-24.9 27.1 to 27.3
30 - 34	Polyphase induction motor, construction, operation, effect of rotor resistance, equation. Starting and speed control methods.	1	32 33	32.1 – 32.14, 33.9 – 33.12, 33.18	32.1 to 32.5
35 - 36	Single phase induction motor, double field revolving theory, characteristics, phase split, shaded pole motors	1	34	34.1 – 34.4, 34.9	

Reference/ Text Books:

1. Textbook of electrical technology Vol. I and II. – By B. L. Theraja, S. Chand and Company, Delhi.
2. Electrical technology – By E. Huges.
3. Electrical machines – By S. K. Bhattacharya.

Practicals:

1. To get familiar with AC, DC machines and measuring instruments;
2. To perform open circuit and short circuit tests on a single phase transformer and hence find voltage regulation and efficiency;
3. To study the constructional details of D.C. machine and to draw sketches of different components;
4. To obtain load characteristics of d.c. shunt/series /compound generator;
5. To study characteristics of DC shunt/ series motors;
6. To study d.c. motor starters;
7. To Perform load-test on 3 ph. induction motor & to plot torque V/S speed characteristics;
8. To perform no load & blocked rotor tests on 3 ph. Induction motor to obtain ckt. parameters & to draw circle diagram;
9. To study the speed control of 3 ph. induction motor by cascading of two induction motors, i.e. by feeding the slip power of one motor into the other motor;
10. To study AC motor starters.
11. To study star delta starters physically and (a) to draw electrical connection diagram (b) to start the 3 ph. induction motor using it. (c) to reverse the direction of 3 ph. I.M.;
12. To start a 3-phase slip –ring induction motor by inserting different levels of resistance in the rotor ckt. and to plot torque –speed characteristics;
13. To perform no load & blocked –rotor test on 1 ph. induction motor & to determine the parameters of equivalent ckt. drawn on the basis of double revolving field theory;
14. To perform load test on 1 ph. induction motor & plot torque–speed characteristics.

Prepared by

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