Course code	Course Name	L-T-P - Credits	Year of Introduction
EE333	Electrical Machines Lab II	0-0-3-1	2016

Prerequisite: EE202 Synchronous and induction machines

Course Objectives

- To give hands on experience in testing Alternators, Three phase and Single phase Induction Motors and induction generators

List of Exercises/Experiments:

1. Regulation of alternator by direct loading
   Objectives:
   a) Determine the regulation of three phase alternator
   b) Plot the regulation vs load curve
2. Regulation of three phase alternator by emf and mmf methods
   Objectives:
   Predetermine the regulation of alternator by emf and mmf method
3. Regulation of alternator by Potier and ASA methods
   Objectives:
   a) Synchronize the alternator by dark lamp method
   b) Plot ZPF characteristics and determine armature reactance mmf and potier reactance
   c) Predetermine the regulation by ZPF method
   d) Predetermine the regulation by ASA method
4. Regulation of alternator by Potier method using inductive load
   Objectives:
   a) Plot ZPF characteristics using a variable inductive load
   b) Predetrmine the regulation by ZPF method
5. Regulation of salient pole alternator using two reaction theory
   Objectives:
   a) Determine the direct and quadrature axis reactances.
   b) Predetermine the regulation of alternator
6. Active and reactive power control in grid connected alternators
   Objectives:
   a) Synchronize the alternator by bright lamp method
   b) Control the active and reactive power
   c) Plot the v-curve and inverted v curve for generator operation
7. Study of induction motor starters
   Objectives:
   a) Start an induction motor using star delta starter and determine the starting current
   b) Plot the dynamic characteristic during IM starting
8. Variation of starting torque with rotor resistance in slip-ring induction motors
   Objectives:
   a) Plot the variation of starting torque against rotor resistance in a three phase slip ring induction motor
   b) Find the external rotor resistance for which maximum starting torque is obtained.
9. Speed control of slip ring induction motor by varying rotor resistance
   Objectives:
   a) Run the slip ring induction motor with constant load torque
   b) Plot the variation of speed against change in rotor resistance
10. Load test on three phase squirrel cage induction motor
    Objectives:
    a) Start the motor using star delta starter
    b) Plot efficiency, line current and power factor against output power
11. Load test on three slip ring induction motor
    Objectives:
    a) Start the motor using auto transformer or rotor resistance starter

b) Plot efficiency, line current and power factor against output power

12. No load and block rotor test on three phase induction motor

Objectives:

a) Predetermination of performance characteristics from circle diagram

b) Determination of equivalent circuit

13. Performance characteristics of pole changing induction motor

Objectives:

a) Run the motor in two different pole combinations (example 4 pole and 8 pole)

b) Determine the performance in the two cases and compare

14. V curve of a synchronous motor

Objectives:

a) Run the motor in two different load conditions

b) Determine v-curve for each load condition

15. Performance characteristics of induction generator

Objective:

a) Run the induction generator with a dc motor prime mover.

c) Plot the performance characteristics of the generator

16. Equivalent circuit of single phase induction motor

Objectives:

a) Conduct no load and blocked tor test on the motor

c) Find the equivalent circuit

17. Electrical braking of slip ring induction motor

Objectives:

a) Dynamic braking

b) Plot the speed variations at different conditions

18. Separation of hysteresis loss in a three phase slip ring induction motor

Objective:

Determine the hysteresis loss in a slip ring induction motor

Out of the above experiments, minimum twelve experiments should be done.

Expected outcome:

- After the successful completion of the course, the students will be able to test and validate DC generators, DC motors and transformers

Text Book:

1. Bimbra P. S., *Electrical Machinery*, 7/e, Khanna Publishers, 2011.
2. Theraja B. L., *A Textbook of Electrical Technology*, S. Chand & Company, New Delhi, 2008.