

ELECTRICAL MACHINE LAB – I

Course Code: 22EE1109

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Prerequisites: Electrical Machines-I

Course Outcomes: At the end of the Course the student shall be able to

- CO1** Determine the performance of a single-phase transformer by conducting Open Circuit (O.C) and Short Circuit (SC) tests and Sumpner’s test.
- CO2** Determine 3-phase to 2-phase transformation using the Scott connection and determine the different losses of the transformers.
- CO3** Determine the performance characteristics of DC shunt and DC compound generators by conducting load tests.
- CO4** Implement the speed control techniques for a separately excited DC motor.
- CO5** Determine the performance characteristics of DC motor by conducting direct and indirect tests.

The following are the experiments required to be conducted as compulsory experiments:

1. O.C. & S.C. tests on a single-phase transformer
2. Determination of efficiency of single-phase transformers using Sumpner’s test.
3. Derive two-phase from a three-phase supply using the Scott connection of two transformers.
4. Separation of hysteresis and eddy current loss in a single-phase transformer
5. Open Circuit Characteristics of DC shunt generator and determination of critical field resistance and critical speed.
6. Load test on a DC shunt generator and determine its performance characteristics.
7. Speed control of separately excited DC motor using armature voltage control
8. Predetermination of efficiency of a DC machine at various loads using Swinburne’s test.
9. Load test on a DC shunt motor and determine its performance characteristics.
10. Separation of various losses in a separately excited DC motor.

In addition to the above 10 experiments, at least any two of the Experiments from the list are required to be conducted:

11. Load test on DC compound generator and determine its performance characteristics.
12. Retardation test on DC shunt motor (for determination of moment of inertia of machines).
13. Hopkinson’s test on two identical DC shunt machines and determination of efficiency.
14. Load test on DC compound motor and determination of performance curves.

15. Load test on a DC series motor and determine its performance characteristics.

TEXT BOOK:

1. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCES:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.