

COURSE OBJECTIVES:

- To understand the concept of electromechanical energy conversion system.
- To identify the appropriate machine for a given application based on its characteristics.
- To identify the appropriate test to determine the performance parameters of a given machine.
- To familiarize with the procedure for parallel operation of generators and transformers.
- To deliberate the working of auto transformer and three phase transformers.

UNIT I ELECTROMECHANICAL ENERGY CONVERSION 9

Fundamentals of Magnetic circuits- Statically and dynamically induced EMF - Principle of electromechanical energy conversion forces and torque in magnetic field systems- energy balance in magnetic circuits- magnetic force- co-energy in singly excited and multi excited magnetic field system mmf of distributed windings – Winding Inductances-, magnetic fields in rotating machines- magnetic saturation and leakage fluxes. Introduction to Indian Standard Specifications (ISS) - Role and significance in testing.

UNIT II DC GENERATORS 9

Principle of operation, constructional details, armature windings and its types, EMF equation, wave shape of induced emf, armature reaction, demagnetizing and cross magnetizing Ampere turns, compensating winding, commutation, methods of improving commutation, interpoles, OCC and load characteristics of different types of DC Generators. Parallel operation of DC Generators, equalizing connections- applications of DC Generators.

UNIT III DC MOTORS 9

Principle of operation, significance of back emf, torque equations and power developed by armature, speed control of DC motors, starting methods of DC motors, load characteristics of DC motors, losses and efficiency in DC machine, condition for maximum efficiency. Testing of DC Machines: Brake test, Swinburne's test, Hopkinson's test, Field test, Retardation test, Separation of core losses-applications of DC motors.

UNIT IV SINGLE PHASE TRANSFORMER 9

Construction and principle of operation, equivalent circuit, phasor diagrams, testing - polarity test, open circuit and short circuit tests, voltage regulation, losses and efficiency, all day efficiency, back-to-back test, separation of core losses, parallel operation of single-phase transformers, applications of single-phase transformer.

UNIT V AUTOTRANSFORMER AND THREE PHASE TRANSFORMER 9

Construction and working of auto transformer, comparison with two winding transformers, applications of autotransformer. Three Phase Transformer- Construction, types of connections and their comparative features, Scott connection, applications of Scott connection.

TOTAL: 45 PERIODS**TEXT BOOKS**

1. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 5th Edition, 2017.
2. P. S. Bimbhra, "Electric Machinery", Khanna Publishers, 2nd Edition, 2021.

REFERENCES

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 6th Edition 2017.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2018.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, First Edition 2008.
4. Sahdev S. K. "Electrical Machines", Cambridge University Press, 2018.

Electrical Machine And Controls Syllabus

B Lingard



Electrical Machine And Controls Syllabus:

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SPECIAL ELECTRICAL MACHINES E.G.

JANARDANAN,2014-01-01 This book covers the complete syllabi prescribed for undergraduate courses in electrical

electronics mechanical and instrumentation engineering offered by various Indian universities The objective of this text is to provide thorough knowledge in the emerging field of special electrical machines It discusses the stepper motor switched reluctance motor permanent magnet dc and ac motors brushless dc motors single phase special electric motors servomotors linear electric machines and permanent magnet axial flux machines Key Features Chapter on permanent magnet axial flux machines not available in other Indian authors books Numerous worked out examples Based on classroom tested materials Simplified mathematical analysis Besides undergraduate students the book will also be useful to the postgraduate students specialising in drives and control power electronics control systems and mechatronics

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Journal ,1925 Includes annual report of its council 1941 48 in pt 1 *MELECON '98, 9th Mediterranean Electrotechnical Conference* ,1998 **Journal of the Institution of Electrical Engineers** ,1925 **Calendar** Imperial College of Science and Technology,1938 Electrical Contractor ,1930 **The Indian and Eastern Engineer** ,1930

Electrical Engineer ,1911 **Soviet Electrical Engineering** ,1968 Engineering ,1928 *The Electrical Journal* ,1917 Automatic Systems for Building the Infrastructure in Developing Countries 2001 (knowledge and Technology Transfer) Georgi M. Dimirovski,2001 This volume records the proceedings of the 2nd IFAC Workshop DECOM TT 2001 held in Orhid Republic of Macedonia 21 23 May 2001

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