

## **ENERGY CONVERSION TECHNIQUES (PME5H001)**

### **MODULE- I (10 Hrs)**

1. **DC GENERATORS:** Constructional features and operating principles, EMF equation, No Load Characteristics for Separately Excited DC Generator and DC Shunt Generator, Conditions for Self Excitation, Critical Resistance and Critical Speed, Losses and Efficiency.
2. **DC MOTORS:** Speed~Armature Current, Torque~Armature Current and Speed~Torque Characteristic for (i) Separately Excited DC Motor, (ii) DC Shunt Motor, (iii) DC Series Motor, Starting, Speed control and application of DC motor.

### **MODULE- II (10 Hrs)**

3. **SINGLE PHASE TRANSFORMERS:** Constructional Features, EMF Equation, Turns Ratio, Open Circuit Test and Short Circuit Test, Losses and Efficiency, Introduction to Three Phase Transformers: Three Single Phase Transformers Connected as a Bank of Three Phase Transformer.
4. **INDUCTION MOTORS:** (a) Three Phase Induction Motors: Constructional Features of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Principle of Operation, Concept of Slip, Slip~Torque Characteristics, Starting of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Speed Control of Induction Motors. (b) Introduction to Single Phase Induction Motors: Construction, Principle of Operation and Application.

### **MODULE- III (10 Hrs)**

5. **THREE PHASE SYNCHRONOUS GENERATORS:** Constructional Features, Principle of operation as Alternator, Synchronous reactance, Equivalent circuit of alternator, Power-Angle curve, Synchronization of alternators.
6. **THREE PHASE SYNCHRONOUS MOTORS:** Constructional Features, Principle of Operation, Torque Expression and Phasor Diagram for Synchronous Motor, Electrical Power and Mechanical Power, Starting and application of Synchronous Motor.

### **Text Book :**

1. Electric Machines – D P Kothari & I J Nagrath – Tata McGraw Hill.

### **Reference Book(s):**

2. The Performance and Design of DC Machines – A E Clayton.
3. Theory and Performance of AC Machines – M G Say
4. Electrical Machinery – P S Bimbhra – Khanna Publishers.
5. Electrical Machines – P K Mukherjee and S Chakravorti – Dhanpat Rai Publications.
6. Electric Machinery – Fitzgerald, Charles Kingsley Jr., S. D. Umans – Tata Mc Graw Hill.
7. Electric Machinery And Transformers – Guru & Hizioglu – Oxford University Press.
8. Electric Machines – Charles Hubert – Pearson Education.