# ACADEMIC SESSION: 2024-25 (Winter)

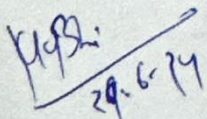| Discipline: Electrical engineering | Semester : 5th | Name of the Teaching Faculty : Kiran Kumar Bhoi |
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| Subject : Energy Conversion-2 | No. of days / week class allotted | Semester From date: 01/07/2024 to 08/11/2024 |
| | | Nos. of Weeks per semester : 15 |

| Week | Class Day | Theory Topics |
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| 1ST | 1st | Types of alternator and their constructional features |
| | 2nd | Basic working principle of alternator and the relation between speed and frequency. |
| | 3rd | Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor). |
| | 4th | Explain harmonics, its causes and impact on winding factor. |
| 2ND | 1st | E.M.F equation of alternator. (Solve numerical problems). |
| | 2nd | Explain Armature reaction and its effect on emf at different power factor of load. |
| | 3rd | The vector diagram of loaded alternator. |
| | 4th | (Solve numerical problems) vector diagram |
| 3RD | 1st | Testing of alternator -Open circuit test, Short circuit test |
| | 2nd | Testing of alternator (Solve numerical problems) |
| | 3rd | Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems) |
| | 4th | Parallel operation of alternator using synchro-scope and dark & bright lamp method. |
| 4TH | 1st | Explain distribution of load by parallel connected alternators. |
| | 2nd | Constructional feature of Synchronous Motor. |
| | 3rd | Principles of operation, concept of load angle |
| | 4th | Derive torque, power developed. |
| 5TH | 1st | Effect of varying load with constant excitation. |
| | 2nd | Effect of varying excitation with constant load. |
| | 3rd | Power angle characteristics of cylindrical rotor motor. |
| | 4th | Explain effect of excitation on Armature current and power factor. |

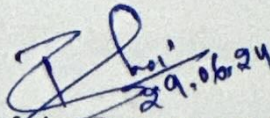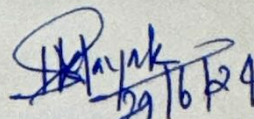| | | | |
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| | | 1st | Hunting in Synchronous Motor. |
| 6TH | | 2nd | Function of Damper Bars in synchronous motor and generator. |
| | | 3rd | Describe method of starting of Synchronous motor. |
| | | 4th | State application of synchronous motor. |
| 7TH | | 1st | Production of rotating magnetic field. |
| | | 2nd | Constructional feature of Squirrel cage and Slip ring induction motors. |
| | | 3rd | Working principles of operation of 3-phase Induction motor |
| | | 4th | Define slip speed, slip and establish the relation of slip with rotor quantities. |
| 8TH | | 1st | Derive expression for torque during starting and running conditions and derive conditions for maximum torque |
| | | 2nd | (solve numerical problems) |
| | | 3rd | Torque-slip characteristics. |
| | | 4th | Derive relation between full load torque and starting torque etc |
| 9TH | | 1st | (solve numerical problems) |
| | | 2nd | Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. |
| | | 3rd | solve numerical problems |
| | | 4th | Methods of starting and different types of starters used for three phase Induction motor part 1 |
| 10TH | | 1st | Methods of starting and different types of starters used for three phase Induction motor part 2 |
| | | 2nd | Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. |
| | | 3rd | Plugging as applicable to three phase induction motor |
| | | 4th | Describe different types of motor enclosures. |

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| 11TH | 1st | Explain principle of Induction Generator and state its applications. |
| | 2nd | Explain Ferrari's principle. |
| | 3rd | Explain double revolving field theory and Cross-field theory to analyze starting torque of 1 -phase induction motor. |
| | 4th | Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors, Split phase motor, Capacitor Start motor.0 |
| 12th | 1st | Capacitor start, capacitor run motor, Permanent capacitor type motor, Shaded pole motor. |
| | 2nd | Explain the method to change the direction of rotation of above motors. |
| | 3rd | Construction, working principle, running characteristic and application of single phase series motor. |
| | 4th | Construction, working principle and application of Universal motors. |
| 13th | 1st | Working principle of Repulsion start Motor, Repulsion start Induction run motor |
| | 2nd | Working principle of Repulsion Induction motor. |
| | 3rd | Principle of Stepper motor. |
| | 4th | Classification of Stepper motor |
| 14th | 1st | Principle of variable reluctant stepper motor. |
| | 2nd | Principle of Permanent magnet stepper motor. |
| | 3rd | Principle of hybrid stepper motor. |
| | 4th | Applications of Stepper motor. |
| 15th | 1st | Explain Grouping of winding, Advantages. |
| | 2nd | Explain parallel operation of the three phase transformers. |
| | 3rd | Explain tap changer (On/Off load tap changing) |
| | 4th | Maintenance Schedule of Power Transformers. |

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