GANDHI SCHOOL OF ENGINEERING

BHABANDHA,BERHAMPUR

BRANCH:- ELECTRICAL ENGINEERING

SEMESTER:- 5TH

SUBJECT- ENERGY CONVERSION – II

Name of Faculty- ER. BISHNU PRASAD PANDA

			Topic to be taken			Actual topictaken		
Sl. No	**Topic/Module**	**No. of period**	**Details of the topics**	**Date**	**Topic No.**	**Topic Name**	**Date**	**Remarks**
1	**ALTERNATOR**	**14**	**ALTERNATOR:** 1.1. Types of alternator and their constructional features. 1.2. Basic working principle of alternator and the relation between speed and frequency. 1.3. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor). 1.4. Explain harmonics, its causes and impact on winding factor. 1.5. E.M.F equation of alternator.	**17.09.2022 To 17.10.2022**	**1.1 1.2 1.3 1.4 1.5 1.6**	Types of alternator and their constructional features. Basic working principle of alternator and the relation between speed and frequency. Terminology in armature winding and expressions for winding factors (Pitch factor, Distribution factor). Explain harmonics, its	**17.09.2022 19.09.2022 20.09.2022 22.09.2022 22.09.2022 24.09.2022 27.09.2022 27.09.2022 29.09.2022 30.90.2022 11.10.2022 12.10.2022**	

			(Solve numerical problems). 1.6. Explain Armature reaction and its effect on emf at different power factor of load. 1.7. The vector diagram of loaded alternator. (Solve numerical problems) 1.8. Testing of alternator (Solve numerical problems) 1.8.1. Open circuit test. 1.8.2. Short circuit test. 1.9. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems) 1.10. Parallel operation of alternator using synchro-scope and dark & bright lamp method. 1.11. Explain distribution of load by parallel connected alternators.		**1.7** **1.8** **1.8.1** **1.8.2** **1.9** **1.10** **1.11**	causes and impact on winding factor. E.M.F equation of alternator. (Solve numerical problems). Explain Armature reaction and its effect on emf at different power factor of load. The vector diagram of loaded alternator. (Solve numerical problems) Testing of alternator (Solve numerical problems) Open circuit test. Short circuit test. Determination of voltage regulation of Alternator by direct loading and synchronous impedance method. (Solve numerical problems) Parallel operation of alternator using synchro-scope and dark & bright lamp method. Explain distribution of load by parallel connected alternators.	**13.10.2022** **17.10.2022**	

2	**SYNCHRONOUS MOTOR:**	**08**	**SYNCHRONOUS MOTOR:** 2.1. Constructional feature of Synchronous Motor. 2.2. Principles of operation, concept of load angle 2.3. Derive torque, power developed. 2.4. Effect of varying load with constant excitation. 2.5. Effect of varying excitation with constant load. 2.6. Power angle characteristics of cylindrical rotor motor. 2.7. Explain effect of excitation on Armature current and power factor. 2.8. Hunting in Synchronous Motor. 2.9. Function of Damper Bars in synchronous motor and generator. 2.10. Describe method of starting of Synchronous motor. 2.11. State application of synchronous motor	**18.10.2022** **To** **12.11.2022**	**2.1** **2.2** **2.3** **2.4** **2.5** **2.6** **2.7** **2.8** **2.9** **2.10** **2.11**	Constructional feature of Synchronous Motor. Principles of operation, concept of load angle Derive torque, power developed. Effect of varying load with constant excitation. Effect of varying excitation with constant load. Power angle characteristics of cylindrical rotor motor. Explain effect of excitation on Armature current and power factor. Hunting in Synchronous Motor. Function of Damper Bars in synchronous motor and generator. Describe method of starting of Synchronous motor. State application of synchronous motor	**18.10.2022** **19.10.2022** **20.10.2022** **22.10.2022** **27.10.2022** **01.11.2022** **02.11.2022** **05.11.2022** **12.11.2022**	
3	**THREE PHASE INDUCTION MOTOR**	**14**	**THREE PHASE INDUCTION MOTOR:** 3.1. Production of rotating magnetic field. 3.2. Constructional feature of Squirrel cage and Slip ring induction motors. 3.3. Working principles of operation of 3-phase Induction motor.	**14.11.2022** **To** **12.12.2022**	**3.1** **3.2** **3.3** **3.4** **3.5** **3.6**	Production of rotating magnetic field. Constructional feature of Squirrel cage and Slip ring induction motors. Working principles of operation of 3-phase Induction motor.	**14.11.2022** **17.11.2022** **19.11.2022** **21.11.2022** **22.11.2022** **24.11.2022** **26.11.2022**	

			3.4. Define slip speed, slip and establish the relation of slip with rotor quantities. 3.5. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems) 3.6. Torque-slip characteristics. 3.7. Derive relation between full load torque and starting torque etc. (solve numerical problems) 3.8. Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems) 3.9. Methods of starting and different types of starters used for three phase Induction motor. 3.10. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. 3.11. Plugging as applicable to three phase induction motor. 3.12. Describe different types of motor enclosures. 3.13. Explain principle of Induction Generator and state its applications.		**3.7** **3.8** **3.9** **3.10** **3.11** **3.12** **3.13**	Define slip speed, slip and establish the relation of slip with rotor quantities. Derive expression for torque during starting and running conditions and derive conditions for maximum torque. (solve numerical problems) Torque-slip characteristics. Derive relation between full load torque and starting torque etc. (solve numerical problems) Establish the relations between Rotor Copper loss, Rotor output and Gross Torque and relationship of slip with rotor copper loss. (solve numerical problems) Methods of starting and different types of starters used for three phase Induction motor. Explain speed control by Voltage Control, Rotor resistance control, Pole changing, frequency control methods. Plugging as applicable to three phase induction motor. Describe different types of	**02.12.2022** **03.12.2022** **06.12.2022** **07.12.2022** **19.12.2022** **10.12.2022** **12.12.2022**	

						motor enclosures. Explain principle of Induction Generator and state its applications.		
4	**SINGLE PHASE INDUCTION MOTOR**	**08**	**SINGLE PHASE INDUCTION MOTOR:** 4.1. Explain Ferrari's principle. 4.2. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor. 4.3. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. 4.3.1. Split phase motor. 4.3.2. Capacitor Start motor. 4.3.3. Capacitor start, capacitor run motor. 4.3.4. Permanent capacitor type motor. 4.3.5. Shaded pole motor. 4.4. Explain the method to change the direction of rotation of above motors.	**13.12.2022 To 10.01.2023**	**4.1 4.2 4.3 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.4**	Explain Ferrari's principle. Explain double revolving field theory and Cross-field theory to analyze starting torque of 1-phase induction motor. Explain Working principle, Torque speed characteristics, performance characteristics and application of following single phase motors. Split phase motor. Capacitor Start motor. Capacitor start, capacitor run motor. Permanent capacitor type motor. Shaded pole motor. Explain the method to change the direction of rotation of above motors.	**13.12.2022 15.12.2022 19.12.2022 20.12.2022 22.12.2022 02.01.2023 05.01.2023 07.01.2023 10.01.2023**	
5	**COMMUTATOR MOTORS**	**06**	**COMMUTATOR MOTORS**: 5.1. Construction, working principle, running characteristic and application of single phase series motor. 5.2. Construction, working principle and application of Universal motors.	**10.01.2023 To 11.01.2023**	**5.1 5.2 5.3**	Construction, working principle, running characteristic and application of single phase series motor. Construction, working	**10.01.2023 11.01.2023**	

			5.3. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.			principle and application of Universal motors. Working principle of Repulsion start Motor, Repulsion start Induction run motor, Repulsion Induction motor.		
6	**SPECIAL ELECTRICAL MACHINE**	**05**	**SPECIAL ELECTRICAL MACHINE:** 6.1. Principle of Stepper motor. 6.2. Classification of Stepper motor 6.3. Principle of variable reluctant stepper motor. 6.4. Principle of Permanent magnet stepper motor. 6.5. Principle of hybrid stepper motor. 6.6. Applications of Stepper motor.		**6.1** **6.2** **6.3** **6.4** **6.5** **6.6**	Principle of Stepper motor. Classification of Stepper motor Principle of variable reluctant stepper motor. Principle of Permanent magnet stepper motor. Principle of hybrid stepper motor. Applications of Stepper motor.		
7	**THREE PHASE TRANSFORMERS**	**05**	**THREE PHASE TRANSFORMERS:** 7.1. Explain Grouping of winding, Advantages. 7.2. Explain parallel operation of the three phase transformers. 7.3. Explain tap changer (On/Off load tap changing) 7.4. Maintenance Schedule of Power Transformers.		**7.1** **7.2** **7.3** **7.4**	Explain Grouping of winding, Advantages. Explain parallel operation of the three phase transformers. Explain tap changer (On/Off load tap changing) Maintenance Schedule of Power Transformers.		

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