



Reg. No. : .....

Name : .....

**Sixth Semester B.Tech. Degree Examination, May 2011**  
**(2008 Scheme)**  
**Electrical and Electronics Engineering**  
**08.601 : ELECTRICAL MACHINES III (E)**

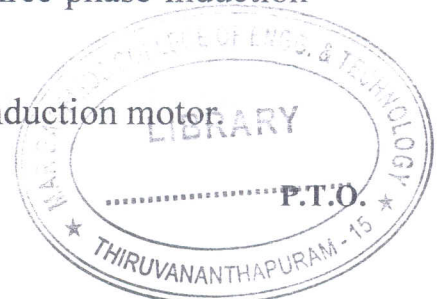
Time : 3 Hours

Max. Marks : 100

*Instruction : Answer all questions from Part A and any one question from each Module of Part B.*

**PART – A**

1. With the help of neat sketches, explain the differences between three phase slip ring induction motor and three phase squirrel cage induction motor.
2. Explain the term slip and slip frequency and derive the expression for rotor frequency in terms of main supply frequency and slip for a three phase induction motor.
3. Draw and explain the torque-slip characteristic of a three phase induction motor. Mark the starting torque and maximum torque on the diagram so drawn. How do starting and maximum torques vary with the rotor resistance.
4. Explain the phenomenon of cogging and crawling in squirrel cage induction motors.
5. In double cage poly phase induction motor, explain how the desirable features of high starting torque and low operating torque are obtained.
6. Draw and explain the induction motor torque-speed characteristic under V/f control.
7. Explain 'cascade arrangement' for controlling speed of three phase induction motors.
8. Describe the construction and working of a synchronous induction motor.





9. Describe the constructional features and principle of operation of a linear induction motor.
10. Explain the working principle of a universal motor and mention its applications. **(10×4=40 Marks)**

**PART – B**  
**(20 Marks each)**

**Module – I**

11. a) Derive from first principles, the relation between the power transferred to rotor, mechanical power developed and copper losses in the rotor of a three phase induction motor and also obtain the expression for torque developed in synchronous watts. **10**
- b) A 6 poles 3 phase 50 Hz induction motor develops maximum torque of 300 Nm at a speed of 960 rpm. Determine the torque exerted by the motor at 5% slip. The rotor resistance per phase is 0.6 ohms. **10**

OR

12. a) Explain the procedure of No load and Blocked rotor test on the three phase induction motor and draw and obtain the parameters of equivalent circuit from the test result. **10**
- b) A 20 h.p 400V, 50 Hz. three phase star connected induction motor has the following test data.
- No load test      400V 9A  $\cos\phi = 0.2$
- Blocked rotor test 200V 50A  $\cos\phi = 0.4$
- Draw a circle diagram and determine :
- line current
  - power factor
  - slip
  - efficiency at full load. **10**



**Module – II**

13. State the various methods of starting of three phase induction motors. Explain, with the help of neat diagram the working of a star delta starter, auto transformer starter and a starting method for slip ring induction motor. **20**

OR

14. Describe with neat diagram the principle of operation of an induction generator. Compare it with a synchronous generator and write the applications of induction generator. **20**

**Module – III**

15. a) Draw and explain the Torque speed characteristics of a single phase induction motor on the basis of double field revolving theory. **14**
- b) Draw connection diagram of a capacitor-start and capacitor-run single phase induction motor. **6**

OR

16. a) Describe the constructional features and operating characteristics of a shaded pole motor. Give its uses. **10**
- b) Explain the principle of operation of a Brushless DC motor and a Switched Reluctance motor. **10**
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