



Reg. No. : .....

Name : .....

**Sixth Semester B.Tech. Degree Examination, June 2018  
(2008 Scheme)**

**08.601 : ELECTRICAL MACHINES – III (E)**

Time : 3 Hours

Max. Marks : 100

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

**PART – A**

**(10×4=40 Marks)**

1. List the differences between squirrel cage and slip ring rotor.
2. Sketch and describe the typical torque – slip characteristics of a three phase induction motor.
3. A 8 pole, three phase induction motor is supplied from 50 Hz, a.c. supply. On full load, the frequency of induced e.m.f. in rotor is 2 Hz. Find the full load slip and corresponding speed.
4. What will happen if unbalanced 3 $\phi$  supply is given to a 3 $\phi$  Induction Motor ?
5. How the speed of an induction motor be controlled ?
6. Explain any one breaking method of an induction motor.
7. How do you run an induction motor as an induction generator ?
8. List the different methods of single phase induction motor starting.
9. Describe the features of linear Induction Motor.
10. Enumerate the features and applications of Switched Reluctance motor.



PART – B  
Module – I

11. a) Explain with a neat diagram, the construction and operation of a three phase induction motor. 10
- b) A 400 V, 4 pole, 3 phase, 50 Hz star connected induction motor has a rotor resistance and reactance per phase equal to  $0.01 \Omega$  and  $0.1 \Omega$  respectively. Determine (i) starting torque (ii) speed and slip at which maximum torque will occur (iii) maximum torque (iv) full load torque if full load slip is at 4%. Assume ratio of stator to rotor turns as 4. 10

OR

12. a) A three phase, 4 pole, 50 Hz, star connected induction motor running on full load develops a useful torque of 300 N-m. The rotor e.m.f. is completing 120 cycles per minute. If torque lost in friction is 50 Nm, calculate (i) Slip (ii) Net power output (iii) Rotor copper loss per phase (iv) Rotor efficiency and (v) Rotor resistance per phase if rotor current is 60 A in running condition. 12
- b) Develop an equivalent circuit for three phase induction motor. State the difference between exact and approximate equivalent circuit. 8

Module – II

13. a) Explain with relevant diagrams, the working of (i) Star – Delta starter (ii) Auto transformer starter. 10
- b) Explain the cascade control of the two induction motors. 10

OR

14. a) The ratio of maximum torque to full-load torque in a three phase squirrel cage induction motor is 2.2 : 1. Determine the ratio of actual starting torque of full load torque for direct starting, star-delta starting and Auto transformer starting with tapping of 70%, The rotor resistance and standstill reactance per phase are  $0.5 \Omega$  and  $5 \Omega$  respectively. 12
- b) Explain with necessary diagrams, the operation of a self excited induction generator. 8

Module – III

15. a) Explain with necessary diagrams, the double field revolving theory. 10
- b) Explain with a neat diagram, the principle of operation of a Brushless DC motor. 10

OR

16. a) Develop an equivalent circuit for a single phase induction motor. 8
- b) Explain the construction features and principle of operation of single phase series motor. 12