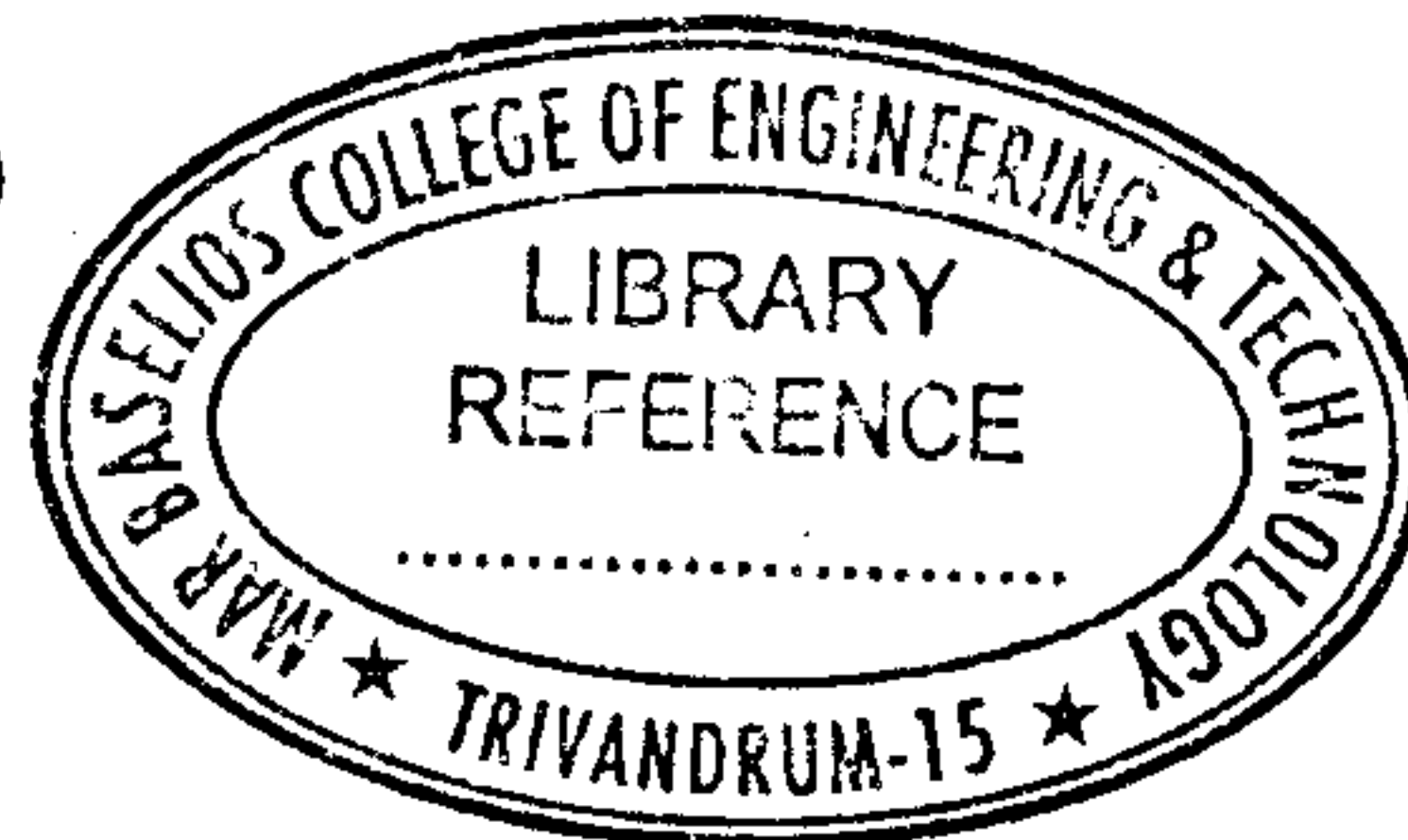




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B – 5561

Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, March 2017
(2008 Scheme)**

08.601 : ELECTRICAL MACHINES – III (E)

Time : 3 Hours

Max. Marks : 100

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

PART – A (4 Marks each)

1. What are the advantages of slip ring induction motors over cage induction motors ?
2. Why are the slots on the rotor of induction motors usually skewed ?
3. What is meant by harmonic synchronous torque in induction motors ?
4. Explain briefly the construction of a double cage rotor.
5. Why is pole changing method of speed control not used with wound rotor motors ?
6. What are the different types of braking as applied to 3-phase induction motors ?
7. What are the limitations and disadvantages of speed control of induction motor by changing rotor circuit resistance ?
8. Why is the powerfactor of a single phase induction motor low ?
9. What is the principle of shaded pole motor ?
10. State the applications of linear induction motor.

PART – B (20 Marks each)

Module – I

11. a) Derive the condition for maximum torque developed in a 3-phase induction motor and hence prove that to increase the starting torque, extra resistance must be added to the rotor circuit. 10
- b) The resistance and stand still reactance of each phase of a 3-phase induction motor with star-connected rotor are 0.06Ω and 0.4Ω respectively. The full-load slip is 4%, calculate the resistance per phase of a star-connected rheostat which when connected to the rotor circuit will give a pull-out torque at one half of the full-load speed. What is the corresponding pf ? 10

OR

P.T.O.



12. a) How can the parameters of the equivalent circuit of a 3-phase induction motor be determined experimentally? Explain. 10
- b) A 415 V, delta-connected, 3-phase induction motor gave the following readings on no-load test : 415 V, 9A, 1250 W. Find the
- i) no-load powerfactor and
 - ii) the parameters of the shunt branch of the equivalent circuit. 10

Module – II

13. a) With the help of a neat sketch, describe the principle of working of a star-delta starter for an induction motor. When can this type of starter be used? 10
- b) A 3-phase, 415 V induction motor has a star-connected rotor winding with a stator to rotor turns ratio of 6. The rotor winding resistance and standstill reactance per phase are $0.05\ \Omega$ and $0.26\ \Omega$ respectively, find the value of external resistance per phase to be added in the rotor circuit to obtain maximum torque at starting, what will be the stator current? 10

OR

14. a) Explain the principle of operation of an induction generator. How can it be self-excited? 10
- b) A 4 pole, 50 Hz, 3-phase slip ring induction motor is cumulatively cascaded with a 6-pole induction motor. Determine the frequency of the rotor in the two motors and their slip referred to respective stator field if the set has a slip of 3%. 10

Module – III

15. a) Explain the operation and constructional features of a capacitor start and run induction motor. Draw its torque-slip characteristic. 10
- b) A 250 W, 230 V, 50 Hz, single phase capacitor-start induction motor has the following constants for its main and starting windings.
- Main winding : $R = 4.5\ \Omega$, $X_L = 3.5\ \Omega$
- Starting winding : $R = 9.5\ \Omega$, $X_L = 3.5\ \Omega$
- Determine the value of the starting capacitor that will result in the maximum starting torque. 10

OR

16. Write short notes on :
- a) AC series motor 10
 - b) Switched reluctance motor. 10
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