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Reg. No. :

Name :

Sixth Semester B.Tech. Degree Examination, September 2020.

(2008 Scheme)

08.601 ELECTRICAL MACHINES III (E)

Time : 3 Hours

Max. Marks. : 100

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

PART – A

1. Explain briefly the torque slip characteristics of 3 Phase induction motor.
2. Write short note on Crawling and Cogging.
3. Draw the equivalent circuit of a three phase induction motor and explain.
4. Explain various methods adopted for braking in induction machines.
5. State the effects of increasing rotor resistance on starting current, starting torque, maximum torque and full load slip of an induction.
6. Briefly explain the speed control technique employed in slip ring induction motor.
7. Briefly explain V/f control.
8. Explain the working of repulsion motor.

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9. Discuss capacitor start capacitor run starting of single phase induction motor.
10. Briefly explain synchronous induction motor.

(10 × 4 = 40 marks)

PART – B

Module I

11. (a) The following test data was obtained for a 3.73kW, 200V, 50Hz, 4 pole, 3 phase star connected induction motor. Draw the circle diagram and estimate from the diagram for full load condition the following.

No-Load Test

Line Voltage	200 V
Line Current	5 A
Total Input	350 W

Blocked Rotor Test

Line Voltage	100 V
Line Current	26 A
Total Input	1700 W

- (i) Line Current
- (ii) Power Factor
- (iii) Maximum torque in terms of the full load torque

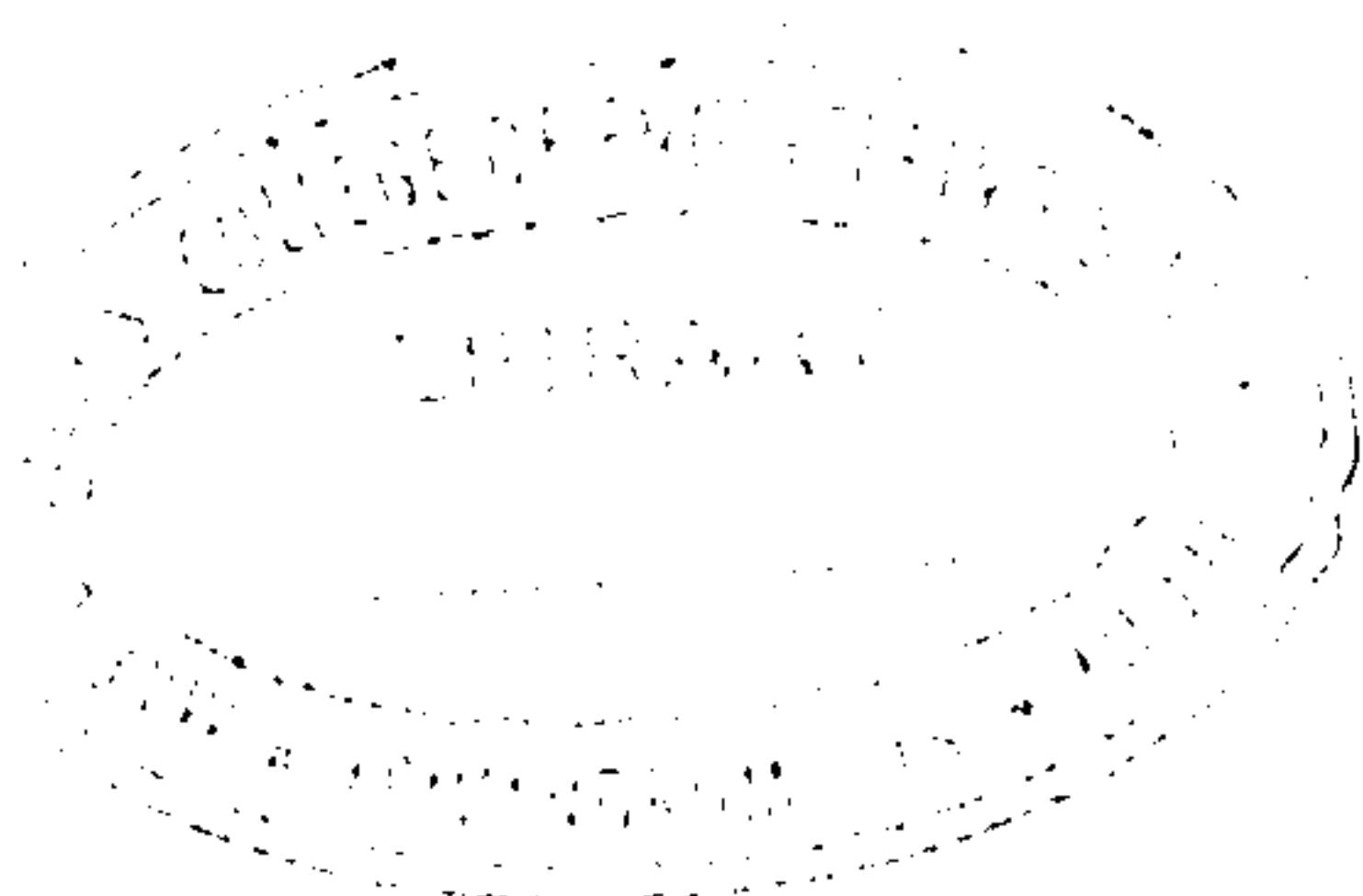
The rotor copper loss at standstill is half the total copper loss. (14)

- (b) Derive an expression for torque in an induction motor and obtain the condition for maximum torque. (6)

OR

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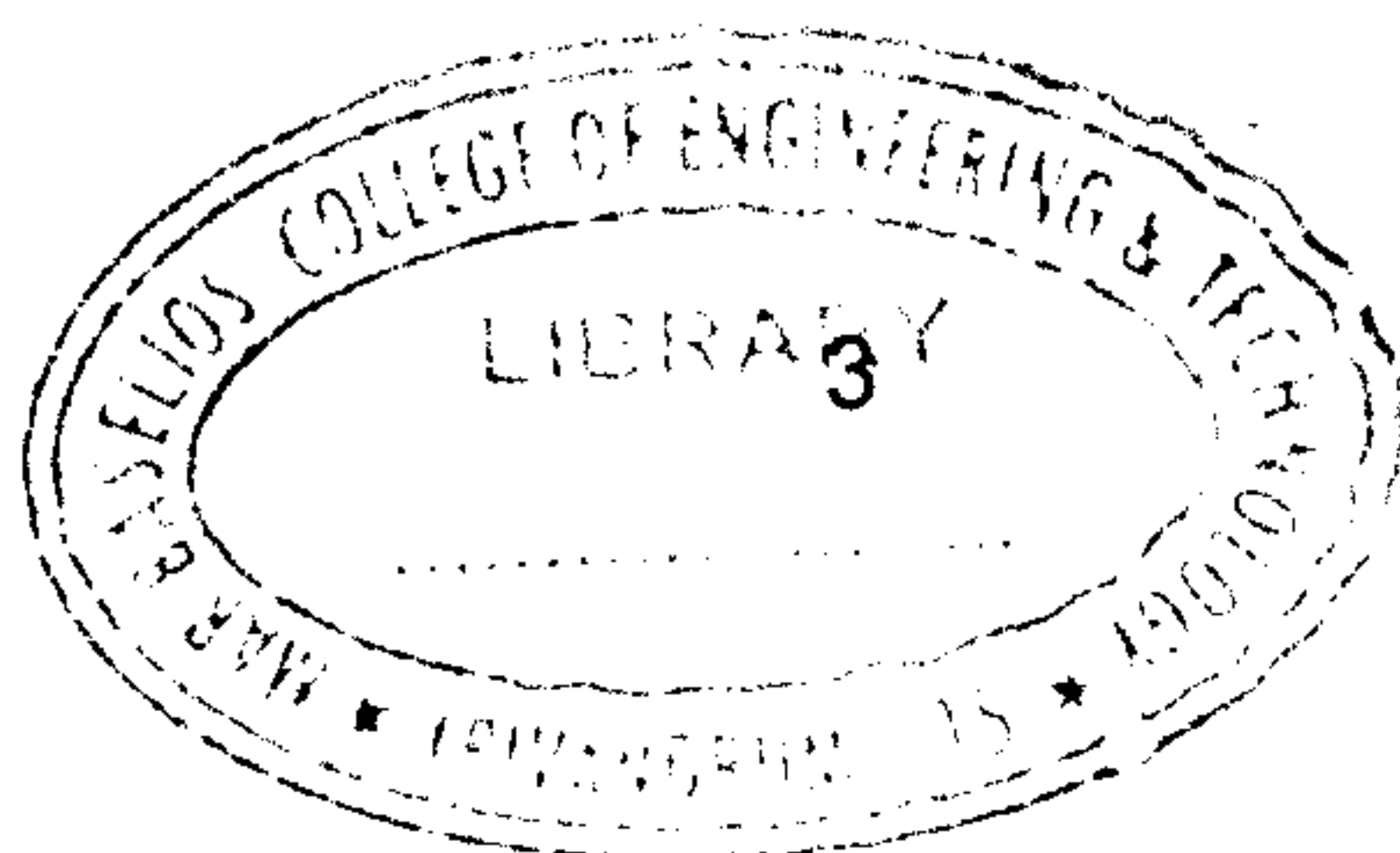
12. (a) Briefly explain the construction and principle of operation of Poly phase induction machines. (10)
- (b) The starting torque and maximum torque of a three-phase induction motor are 140% and 220% of the full load torque. Neglecting stator resistance and assuming constant rotor resistance, calculate
- (i) The slip at maximum torque
- (ii) Full load slip
- (iii) Rotor current at starting in terms of full load rotor current (10)

Module II

13. (a) Briefly explain slip power recovery scheme employed in three phase induction motor. (10)
- (b) Briefly explain DOL starting of induction motor. (10)

OR

14. (a) Calculate the steps in a 5-step rotor resistance starter for a three-phase induction motor. The slip at the maximum starting current is 2 per cent with slip ring short circuited and the resistance per rotor phase is 0.015Ω . (6)
- (b) Briefly explain the construction and operating principle of double cage induction motor. Draw and explain torque slip characteristics of the motor. (14)



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Module III

15. (a) Briefly explain the construction principle of operation and applications of shaded pole motors. (10)
- (b) Explain briefly the working of single phase induction motor on the basis of double field revolving theory. (10)

OR

16. (a) Briefly explain the constructional details and principle of operation of Linear induction motor. (12)
- (b) Explain the principle of operation of brushless DC motor. (8)

