



Reg. No. :

Name :

Sixth Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
Branch : Electrical and Electronics
08.601 : ELECTRICAL MACHINES – III(E)

Time : 3 Hours

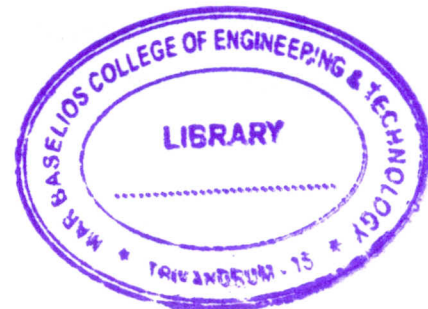
Max. Marks : 100

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

PART – A

(4 Marks each)

1. What are the advantages and disadvantages of a wound rotor induction motor over a squirrel cage induction motor ?
2. What is the effect of changing rotor resistance on torque slip characteristics of a 3 phase induction motor ? Explain.
3. Show that the rotor copper loss of a 3 phase induction motor is slip times the power transferred across the gap.
4. Draw the phasor diagram of a 3 phase induction motor on load condition and explain.
5. Prove that the locus of the stator current phasor of a 3 phase induction motor is a circle when supply voltage is constant.
6. Explain the phenomenon of cogging and crawling in induction motors.
7. Explain how regenerative braking can be employed in a 3 phase induction motor ?
8. State the reasons for the inferior performance of a single phase induction motor compared to 3 phase induction motor.
9. Why ac series motors are built with large number of armature conductors and with as few field turns as possible ?
10. Explain the principle of magnetic levitation.



P.T.O.



PART – B

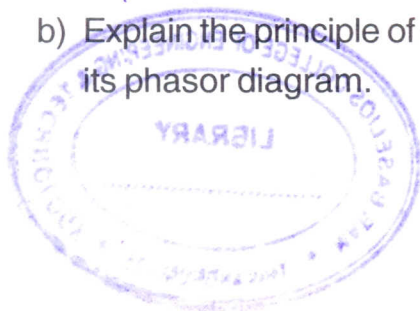
(20 Marks ea

MODULE – 1

11. a) Derive the equivalent circuit of a 3 phase induction motor. What is the difference between the exact and approximate equivalent circuits ?
- b) The full load input to a 3phase induction motor is 50 kW and the slip is 3%. Neglecting stator losses, calculate the full load copper losses per phase and the total mechanical power developed.
12. a) Explain how a large starting torque can be obtained by a double cage construction. Compare the performance of a double cage motor with that of a single cage motor.
- b) A 400 V, delta connected, 3 phase induction motor has a stator and equivalent rotor standstill impedance of $(4+j10)\Omega$ and $(3+j10)\Omega$ per phase respectively. The motor takes a line current of 3.5 A and a power of 400 W at rated voltage at load. Using approximate equivalent circuit, determine for a slip of 5%, the 1) line current 2) power factor and 3) the mechanical power developed.

MODULE – 2

13. a) State various methods of starting of a 3 phase induction motor. Explain with the help of diagram the working of an automatic direct on line starter.
- b) A 3 phase squirrel cage induction motor has a ratio of maximum torque to full load torque as 2.5 : 1. Determine the ratio of actual starting torque to full load torque for auto transformer starting with a tapping of 75%. The rotor resistance = 0.4Ω and $X_2 = 4\Omega$.
14. a) Explain any two methods of speed control of 3 phase squirrel cage induction motor.
- b) Explain the principle of operation of an induction generator. Draw and explain its phasor diagram.





MODULE – 3

15. a) Explain the principle of operation of linear induction motor. State its important applications.
- b) Describe the constructional features and operating characteristics of a 1ϕ shaded pole induction motor.
16. a) Describe the advantages of synchronous induction motor over ordinary synchronous motor. Indicate the various methods of providing excitation for this motor.
- b) Describe the construction and working of repulsion motor. Write its merits and demerits compared to series motors.
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