GANPAT UNIVERSITY
B.TECH SEM-IV (MARINE ENGINEERING)
REGULAR EXAMINATION APRIL-JUNE 2016
2MR401: Alternators & Motors

Time: 3 Hours   Total Marks:-60

Instructions: - 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

SECTION-I

Q:1 (A) Discuss Working principle & construction of Induction motor.   (5)

(B) Discuss different speed control method for 3 phase Induction Motor.   (5)

OR

Q:1 (A) Draw and explain an equivalent circuit of 1 phase Induction Motor.   (5)

(B) Draw and explain Torque-Slip characteristics of 3 phase induction motor.   (5)

Q:2 (A) Draw the circle diagram from no-load and short-circuit test of a 3-phase. 40 hp, 420V, 6-   (10)
pole induction motor from the following test results (line values).

No-load   : 420 V   18 A   p.f = 0.15
Short-Circuit : 210 V   140 A   p.f = 0.25

Rotor Cu loss at standstill is half the total Cu loss. From the diagram, find (a) line current, slip, efficiency and p.f at full load (b) the maximum torque.

OR

Q:2 (A) The power input to the rotor of 440V, 50 Hz, 6 pole, 3 Φ is 80 kw. The electromotive   (5)
forced to observe to make 100 complete alternation per minute. Calculate (1) Slip (2) Rotor Speed (3) Rotor Cu loss.

(B) Derive equation of starting torque and condition for max. Starting torque of Induction   (5)
Motor.

Q:3 (A) A 3Φ induction motor having star connected rotor has an induced e.m.f. of 80 volts   (5)
between slip rings at standstill on open circuit. The rotor has resistance and reactance per phase of 1Ω and 4Ω respectively. Calculate current/phase and power factor when (1) slip rings are short circuited (2) slip rings are connected to a star connected rheostat of 3Ω/phase.

(B) Explain No load and Blocked rotor test for 3-phase induction motor.   (5)

SECTION-II

Q:4 (A) Explain principle, construction and working of Alternator.   (6)

     (B) Define: 1) Pitch Factor 2) Distribution Factor   (4)

OR

Q:4 (A) Derive E.M.F. equation of an alternator.   (6)

     (B) Find the no-load phase and line voltage of a star-connected 3-phase, 6-pole Alternator   (4)
          which runs at 1200 rpm, having flux per pole of 0.1 wb sinusoidally distributed. Its stator
          has 54 slots having double layer winding. Each coil has 8 turns and the coil is chorded by 1
          slot.

Q:5 (A) Why Synchronous motor is not self-starting? Briefly Discuss the methods to start the   (6)
          Synchronous Motor?

     (B) Calculate the R.M.S. value of the induced e.m.f. per phase of a 10-pole, 3-phase, 50-Hz   (4)
          alternator with 2 slots per pole per phase and 4 conductors per slot in two layers. The coil
          span is 150°. The flux per pole has a fundamental component of 0.12 Wb and a 20% third
          component.

OR

Q:5 (A) Explain Synchronous Motor Application & Explain in details synchronous condenser?   (6)

     (B) Draw & explain V-Curve of Synchronous Motor?   (4)

Q:6 (A) State condition necessary for parallel operation of alternator? Also List out advantages of   (6)
          parallel operation of alternator?

     (B) Comparison Synchronous and Induction Motor?   (4)

END OF PAPER