[4658] – 62

Seat No.	

T.E. (Electrical) (Semester – I) Examination, 2014
ELECTRICAL MACHINES – II
(2008 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **3** questions from Section **I** and **3** questions from Section **II**.*
*2) Answers to the **two** Sections should be written in **separate** books.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Black figures to the **right** indicate **full** marks.*
*5) **Use** of electronic pocket calculator is **allowed**.*
*6) **Assume** suitable data, if necessary.*

SECTION – I

1. a) Explain mmf method for finding out voltage regulation of alternator. **8**

   b) A 3 phase star connected alternator, having 16 poles runs at 375 rpm. It has 144 stator slots with 10 conductors per slots. The phase value of induced emf is 1534 volts. Calculate the flux per pole. Assume full pitch winding. **6**

   c) Compare salient pole and non salient pole synchronous machines. **4**

OR

2. a) Determine voltage regulation of 2000 V, 1 – phase alternator having current of 100 A at
      i) 0.8 pf lead
      ii) 0.71 pf lag

      A full load current of 100 A is produced in short circuit test by field current of 2.5 A while an emf of 500 V is produced in open circuit test by the same field current. Take armature resistance = 0.8 Ω. **8**

   b) Define armature reaction in core of 3 ϕ alternator. Explain its effects at zero p.f. load and zero p.f. lag. **6**

   c) With usual notations derive the emf equation in case of 3 phase alternators. **4**

P.T.O.

3. a) Explain different losses occurring in 3 phase synchronous motor. Hence draw the power stage diagram of 3 phase synchronous motor. **8**

   b) With neat diagram, explain the slip test conducted on 3 phase salient pole alternator. How direct and quadrature axis reactance can be determined ? **8**

OR

4. a) A synchronous motor has a synchronous reactance of 10 Ohms per phase and negligible resistance. It takes an input current of J kW per phase when operating at 250 voltage per phase. Find its induced emf and angle of retard. Assume unity p.f. **8**

   b) Explain the need of parallel operation of alternators. Hence explain dark lamp method with neat diagram. **8**

5. a) Write a note on 3 phase induction generator. **8**

   b) Explain :

      i) v/f control method

      ii) Rotor resistance control methods in case of 3 phase induction method. **8**

OR

6. a) With neat diagram explain construction and working of 3 phase synchronous induction motor. **8**

   b) Write a short note on 3 phase induction type voltage regulator. **8**

SECTION – II

7. a) Explain the operation of d. c. series motor on a.c. supply. Explain the problems associated with AC operation. How these problems can be reduced ? **10**

   b) With neat diagram explain inductively compensated a.c. series motor. **6**

OR

8. a) Describe the procedure for drawing circle diagram of a.c. series motor. How the efficiency at full load, power factor at full load, torque scale can be determined from it ? **10**

   b) Draw and explain the approximate phasor diagram of plain a.c. series motor. **6**

9. a) With suitable diagram explain construction and working of brushless d.c. motor state its applications. **8**

   b) Write a short note on linear induction motor. **8**

OR

10. a) Explain the effects of slot harmonics on performance of the machine. Also give remedial measures for it. **8**

    b) What are harmonic synchronous torque ? What are its effects on induction motor operation ? **8**

11. a) Explain the construction and working of single phase capacitor start induction motor. State applications of this motor. **8**

    b) A 2 pole 240 V, 50 Hz single phase I. M. has following constants referred to the stator

    $R_1 = 2.2\ \Omega$, $X_1 = 3.0\ \Omega$

    $R_2' = 3.8\ \Omega$, $X_2' = 2.1\ \Omega$

    $X_m = 86\ \Omega$

    Calculate the stator current, input power and power factor at full load when motor is operating at 2820 rpm. **10**

OR

12. a) Explain the construction and working of shaded pole induction motor. State applications of this motor. **8**

    b) Explain in detail the tests to be conducted on 1 – phase induction motor to determine the equivalent circuit parameters. Draw the equivalent circuit for the motor showing the parameters determined under running condition neglecting corelosses. **10**

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