Code: EE5T2

III B.Tech - I Semester – Regular/Supplementary Examinations October 2018

ELECTRICAL MACHINES - III
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

11 x 2 = 22 M

1. a) Explain why the field winding is placed on rotor, instead on stator of an alternator.
   b) Define Pitch factor of a synchronous machine.
   c) What could be the reasons if a 3-phase synchronous motor fails to start?
   d) What are the advantages of MMF regulation method of an alternator?
   e) What is meant by two reaction theory?
   f) What are the conditions to be satisfied for parallel operation of alternators?
   g) What is armature reaction of a synchronous machine?
   h) What is meant by hunting in synchronous motors and how it can be avoided?
   i) How are 'V' and 'Λ' curves of synchronous motor are defined?
   j) What is a BLDC Motor? Give some applications.
   k) Explain the principle of operation of a linear induction motor.

PART – B

Answer any *THREE* questions.   All questions carry equal marks.   3 x 16 = 48 M

2. a) Explain the effect of armature reaction on the terminal voltage of an alternator.   8 M

   b) A 3-phase, 20-pole, 360 rpm, star connected alternator has a double-layer winding arranged in 180 slots. There are 6-conductors per slot. Find the emf induced per phase, if the flux per pole is 0.042 Wb. The coils are short-chorded by one slot.   8 M

3. a) Explain clearly what is meant by synchronous impedance of an alternator and how it can be determined experimentally. How does the value of regulation as calculated by synchronous impedance method compared with that obtained from an actual load test.   8 M

   b) A 100 kVA, 3000V, 50Hz 3-phase star connected alternator has effective armature resistance of 0.2 ohms. The field current of 40 A produce short-circuit current of 200 A and an open circuit e. m. f of 1040 V (line). Calculate the full load voltage regulation at 0.8 lagging and 0.8 leading power factors.   8 M

4. a) Explain the role of synchronous generators operation when connected to an infinite bus.   8 M

b) Explain the capability charts of a synchronous generator with neat diagram. 8 M

5. a) Write short notes on hunting and its suppression in synchronous motors. 8 M

b) Explain the variation of current and power factor of a synchronous motor with excitation. 8 M

6. a) What are the merits of BLDC motors. Explain their principle of operation. 8 M

b) What are different types of Linear Induction motor. Mention advantages & disadvantages of Linear Induction motors. 8 M