Code: EE5T2

III B.Tech - I Semester – Regular/Supplementary Examinations
October 2017

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) A salient pole synchronous motor is running at no load. What will happen if its field current is switched off?

b) When a synchronous motor is running at synchronous speed, the torque produced by damper winding is?

c) The maximum power in cylindrical and salient pole machines is obtained respectively at load angles of?

d) What is synchronous condenser?

e) What is MMF method and where is it used?

f) What is synchronous reactance?

g) Find the full load current for a 100MW 13.8 KVA star connected synchronous generator at 0.7 pf.

h) What is hysteresis motor?

i) The synchronous speed for a 3 phase 6-pole induction motor is 1200 rpm. If the number of poles is now reduced

to 4 with the frequency remaining constant, the rotor speed with a slip of 5% will be.

j) What is hunting in synchronous machine?

k) Mention the applications of stepper motor.

PART – B

Answer any *THREE* questions. All questions carry equal marks.

$$3 \text{ x } 16 = 48 \text{ M}$$

2.a) Explain armature reaction in synchronous machines.   8 M

b) The effective resistance of a 3 – phase, Y – connected 50 Hz, 2200 V synchronous generator is 0.5 Ω per phase. On short circuit a field current of 40 A gives the full load current of 200 A. An emf (line to line) of 1100 V is produced on open circuit with the same field current. Determine the synchronous impedance. Also compute the power angle and voltage regulation at full – load 0.8 lagging p.f.   8 M

3. Explain MMF method in finding the regulation of alternator.

16 M

4.a) Explain parallel operation of alternators.   8 M

b) Obtain the expression for synchronous power.   8 M

5.a) A 3300 Volts, delta connected motor has a synchronous reactance per phase (delta) of 18 ohm. It operates at a leading power factor of 0.707 when drawing 800 KW from the mains. Calculate its excitation emf.   8 M

b) Explain the starting methods of synchronous motor.   8 M

6.a) Explain principle of operation of reluctance motor.   8 M

b) Explain principle of operation of linear induction motor.

8 M