PVP 14

Code: EE5T2

III B.Tech - I Semester – Regular Examinations - December 2016

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) Why the air gap is kept non-uniform in Salient Pole Synchronous Machine?
   b) Show the Load characteristics of a Synchronous Generator at different power factors.
   c) Highlight the difference between MMF and ASA methods.
   d) State the reasons for conducting Slip Test at reduced voltages.
   e) What are the characteristics of infinite bus-bars?
   f) What is Capability Curve?
   g) Enumerate the difference between Power Circle and Excitation Circle.
   h) Mention any two methods of starting Synchronous Motor.
   i) Identify the feasibility for using special machines as control system components.
   j) Specify the applications of Stepper Motors.
   k) Elaborate the reason for synchronous Motor not self starting.

PART – B

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

2. a) Derive the expression for Distribution Factor(K_d) for fundamental, third and fifth space harmonics. 8 M

   b) Compare Salient Pole and Cylindrical Pole type synchronous machines in constructional aspects. 8 M

3. a) Debate on Two Reaction Theory which is useful for analysis of Salient Pole Synchronous Machine. 8 M

   b) Compute the value of Voltage Regulation of a star connected 415V, 3-phase alternator delivering full load current of 8.2A at 0.8 pf lagging and 0.707 pf leading using EMF method. The alternator drives a short circuit current of 8.2A when the filed excitation is 0.8A and generates 415V (line to line) for the same excitation. The armature resistance per phase is given as 2 ohms. 8 M

4. a) Intricate the difference between Sub-Transient, Transient and Steady State Reactances of a Salient Pole Synchronous Machine. 8 M

b) Explain the role of Synchronizing Torque in keeping alternators in well synchronism. 8 M

5. a) Convince that Synchronous Motor has got peculiar properties over other machines. 8 M

b) Brief about the Hunting Phenomenon in Synchronous Machines and also specify the reason for its non-occurrence in Cylindrical Machines. 8 M

6. a) With the help of a neat sketch, explain the operation of a Hysteresis Motor. 8 M

b) Debate on the applications of Linear Induction Motors. 8 M