Unit - V

5. Explain the following :

   a) Why synchronous motors do not have self starting torque? How are they started?

   b) Damper winding and hunting in synchronous motor.

   c) Characteristics features of synchronous motor and its important industrial applications.

   d) Explain the working of a elementary stepper motor giving its applications and types.

   OR

   Explain various reactance and time constants from the equivalent circuits of an alternator under transient, subtransient and steady state conditions. Also write the expression for symmetrical short circuit armature current.

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Roll No .....

EX - 503

B.E. V Semester

Examination, December 2015

Electrical Machine - II

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) List various parts of a DC machine with the help of a neat sketch.

   b) What are the important reasons for failure to build up voltage in a DC shunt generator?

   c) What is armature reaction and its effects? Also write methods to neutralise these effects.

   d) What are the methods of improving commutation? Explain any one method.

OR

A 10 kW, 250 V DC 6 pole shunt generator runs at 1000 rpm when delivering full load. The armature has 534 lap connected conductors. Full load copper loss is 0.64 kW. The total brush drop is 1 Volt. Determine the flux per pole. Neglect shunt current.

Unit - II

2. a) What are the characteristics of a DC series motor which differentiates its from other motors?

   b) Which parameters control the speed of a DC motor and how?

   c) What is Swinburne's test and where this test is used?

   d) Justify the need of a starter in a DC motor. Explain working of a DC 3 point starter with a neat sketch.

OR

A 4 pole, 220V DC shunt motor has 540 lap wound conductor. It takes 32 A from the supply mains and develops output power of 5.595 kW. The field winding takes 1A. The armature resistance is 0.09Ω and flux per pole is 30 mwb.

Calculate :

i) The speed

ii) Torque in N-m

Unit - III

3. Differentiate between the following:

   a) Salient and non salient pole synchronous machine.

   b) Full pitch and short pitch winding.

   c) List the causes of harmonics in the emf waveform of a synchronous generators and means adopted to reduce them.

   d) Explain EMF method of determining voltage regulation in a synchronous generator.

OR

A 3 phase, 6 poles star connected alternator has 90 slots with 2 conductors per slot. Pitch of the coils is equal to 4 slots less than the pole pitch. Flux per pole is 0.15 wb and the speed of the alternator is 1000 rpm. Determine the no load terminal voltage.

Unit - IV

4. a) What are the conditions for parallel operation of alternators?

   b) What is Short Circuit Ratio (SCR)?

   c) Explain how SCR is determined from OCC and SCC of a 3 phase synchronous machine.

   d) Explain slip test to determine X_d and X_q of a salient pole machine in the laboratory.

OR

What is synchronising torque?

A 3000 kVA, 6 pole alternator runs at 1000 rpm in parallel with other machines on 3300 V bus bars. Assume synchronous reactance to be 25% of voltage and alternator is star connected, calculate synchronising power and synchronising torque for one mechanical degree of displacement.