Roll No ....

EX - 503

B.E. V Semester

Examination, December 2012

Electrical Machine - II

Time : Three Hours

Maximum Marks : 70/100

Note: Attempt any *two* questions in each unit.
Each unit carry equal marks.

1. a) What is armature reaction? Describe the effects of armature reaction on the operation of d.c. machine? How the armature reaction is minimized?

   b) Derive the emf equation of a d.c. generator?

   c) A lap - wound d.c. shunt generator having 80 slots with 10 conductors per slot generates at no load on emf of 400V when running at 1000 r.p.m. At what speed should it be rotated to generate a voltage of 220V on open circuit?

2. a) Explain what is meant by back e.m.f? Explain the principal of torque production in a d.c. motor.

   b) A 200-V shunt motor develops an output of 17.158 KW when taking 20.2KW. The field resistance is 50Ω and an armature resistance 0.06Ω. What is the efficiency and power input when the output is 7.46KW?

   c) Describe Swinburne's test with the help of a neat diagram to find out the efficiency of a d.c. machine?

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3. a) What is voltage regulation? Explain synchronous impedance method of voltage regulation?

   b) Write short notes on following:
   i) Coil span factor ii) Distribution factor

   c) A 3-phase, 50Hz, 2 pole, star connected turbo alternator has 54 slots with 4 conductor per slot. The pitch of the coil is 2 slot less than the pole pitch. If the machine gives 3300V between lines on open circuit with sinusoidal flux distribution. Determine the useful flux per pole.

4. a) Discuss Blondel's two reaction theory of salient pole synchronous machines?

   b) Describe the slip test method for the measurement of X_d and X_q of synchronous machines?

   c) Two similar alternator operating in parallel have following data:

   Alternator 1 - Capacity 700KW, frequency drops from 50 Hz at no load to 48.5Hz at full load.

   Alternator 2 - Capacity 700KW, frequency drops from 50.5Hz at no load to 48 Hz at full load.

   Calculate how a total load of 1200KW is shared by each alternator. Also find its busbar frequency?

5. a) Explain V and inverted V curves?

   b) Obtain an expression for the natural frequency of undamped oscillation of the rotor of a synchronous motor?

   c) Explain switched reluctance motor? Also write its advantage & disadvantages?