TE-sem-V-Old-Electrical-EM-III 16/5/16

QP Code : 583501

(3 Hours) [Total Marks :100

N.B. : (1) **Question** no.1 is **compulsory**
(2) Attempt any **four** out of remaining.

1. (a) Derive the condition for maximum power output of a synchronous motor and derive an expression for max. Power output. **10**
   (b) Explain slip test on salient pole synchronous motor. **10**

2. (a) A 40kVA, 11kV, 1500 rpm, 50Hz alternator runs in parallel with other machine. Its synchronous reactance is 20%. Find synchroning power per unit mechanical angle of phase displacement for **10**
      (a) No-load
      (b) Full load at 0.8 pf lag
   (b) Explain with neat diagram Hunting is synchronous motor. **10**

3. (a) Explain stepper motor in detail. **10**
   (b) Derive an expression for power developed in salient pole machine acting as a generator. What are components of power. **10**

4. (a) Following data pertains to OCC and ZPF of a 1500kVA, 11kV, 3 phase, 50Hz star connected turbo alternator. **20**

Field current(A)	10	18	24	30	40	45	50
OC Voltage(KV)	4.9	8.4	10.1	11.5	12.8	13.3	13.65
ZPF terminal (V) Voltage	–	6	–	–	–	10.2	–

Find voltage regulation by ZPF method at full load current of 788A at 0.8 pf lag.

5. (a) Explain Blondel's two reaction theory. **10**
   (b) A three phase, 6 pole, 1000rpm alternator has two layer winding accomodated in 4 slots/pole/phase with 8 conductors/ slot. Coils are chorded by one slot and fundamental flux is 0.0187 Wb. Find Kd and Kp and resultant line and phase voltage. Assume alternator star connected. **10**

6. (a) Explain armature reaction in synchronous generator. **10**
   (b) Two similar 1500kVA alternators operate in parallel. Their prime-mover characteristics are such that the frequency of alternator 1 drops uniformly from 50.5Hz on no load to 49 Hz on full load and that of alternator 2 from 50Hz at no load to 48Hz at full load. How will they share a load of 2250kW. **10**

7. (a) Derive an expression for distribution factor and pitch factor. **10**
   (b) Explain starting of synchronous motor. **10**