

- Q7 a) A 230 V, 4 pole, 50Hz star connected synchronous motor has armature resistance and synchronous reactance of  $0.6\Omega$  and  $3\Omega$  per phase respectively. Its field current is so adjusted that motor draws 10A at upf. Now keeping the excitation constant, the load on motor is increased till it draws 40A from supply. Find the new pf, load angle and efficiency if the rotational losses are 1020 W. (10)
- b) Explain how the reactance of a salient pole synchronous machine can be determined. (5)
- Q8 a) Two alternators are rated at 25MW each. They are running in parallel. The speed load characteristics of the driving turbines are such that the frequency of alternator 1 drops uniformly from 50Hz on no-load to 48Hz on full load, and that of alternator 2 from 50Hz to 47.5Hz. How will the two machines share a load of 40MW? Also calculate maximum load that can be delivered by both without overloading either of them. (10)
- b) A 5 MVA, 6-pole, 50Hz, 4000V star connected alternator has  $R_a = 1\Omega$ ,  $X_d = 10\Omega$ ,  $X_q = 6\Omega$  per phase. Determine the excitation voltage at full load and 0.8 power factor lagging. (5)
- Q9 Write short notes on any THREE : (5 x 3)
- Voltage buildup process in a dc shunt generator;
  - 3-point starter
  - Hunting
  - Universal motor