**Electrical Machine Operation & Control**

**Assignment 3**

1. What is the difference between synchronous motors and asynchronous motors? Explain with examples.

2 A 3-phase synchronous motor has a synchronous reactance of 2 ohms and an armature resistance of 0.5 ohms. The motor is connected to a 3-phase supply with a line voltage of 400V and a frequency of 50Hz. If the motor is delivering 10 kW at unity power factor, what is the rotor current?

3 What is the purpose of damper windings in synchronous machines? How do they work?

4 A 3-phase synchronous generator has a rated voltage of 10 kV, a rated power of 5 MVA, and a 5 synchronous reactance of 1 ohm. If the generator is operating at a power factor of 0.8 lagging, what is the field current required to produce the rated voltage?

5 Explain the phenomenon of hunting in synchronous machines. How can it be avoided?

6 A 3-phase synchronous motor is connected to a 3-phase supply with a line voltage of 400V and a frequency of 50Hz. The motor has a synchronous reactance of 2 ohms and an armature resistance of 0.5 ohms. If the motor is delivering 10 kW at a power factor of 0.8 lagging, what is the value of the excitation current?