King Fahd University of Petroleum & Minerals

Electrical Engineering Department

EE 360: Home Work #5

(Synchronous Machines)

Due Dates (Dec. 8th for SMW Classes & Dec. 9th for UT Classes)

1-3. From text book problems 4.6, 4.14, 5.14

4. A 1000 KVA, 4600 V, Y-connected, synchronous generator is operated at rated speed. The field is adjusted and a short-circuit test is done at rated armature current. At this field current, the open circuit voltage is 1744 V. The effective ac resistance of the armature circuit per phase is 1.1 ohms. Calculate the percent regulation of the generator at rated load and 0.8 pf lagging.
5. A three-phase, 2000 hp, 13.2 KV, 60 Hz, 6 pole, Y-connected synchronous motor operates at rated load. The efficiency of the motor is is 90% and the power factor is 0.85 leading. If the synchronous impedance is (3+j32) ohms per phase, calculate for rated condition,
    a) The armature current
    b) The excitation voltage