

**EE 330 Energy Systems (Spring 2012)**

**Homework 6**

**Tuesday, March 20, 2012**

- 1) 4-7abcd
- 2) 4-16ab
- 3) 4-17
- 4) 4-18
- 5) 4-20
- 6) 4-21
- 7) 4-22
- 8) A 12 MVA, 2.4 kV<sub>rms</sub>, 3-phase,  $\Delta$ -connected, 4-pole, 60 Hz, synchronous generator has a per-unit synchronous reactance of 0.3 and a per-unit armature resistance of 0.02. If the generator is providing its rated voltage to a balanced 3-phase load with a power factor of 0.7071 lagging drawing 8 MW, determine: a) synchronous reactance and armature resistance in ohms (sketch 3-phase equivalent circuit), b) armature current for phase *a* (assume phase voltage at angle of 0), c) induced voltage  $\bar{E}_A$  for phase *a*, d) voltage regulation, e) total armature/stator electrical (i.e., copper) losses, and f) machine speed in RPM.

**Due Wednesday, March 28, 2012.**