King Fahd University of Petroleum & Minerals
Department of Electrical Engineering

Quiz # 6 EE360 Energy Conversion December 2007

Name:_____ ID:_____ Grade:_____

A 13.8-kV 10-MVA 0.866-PF-lagging 60-Hz two-pole Y-connected steam-turbine generator has a synchronous reactance of 18 ohm per phase and an armature resistance of 2 ohm per phase. This generator is operating in parallel with a large power system (infinite bus).

a) What is its voltage regulation?
b) What is the torque angle of the generator at rated conditions?
c) If the field current is constant, what is the maximum power possible out of this generator? How much reserve power or torque does this generator have at full load? **(Ignore the effect of armature resistance)**
d) At the absolute maximum power possible, how much reactive power will this generator be supplying or consuming? Sketch the corresponding phasor diagram. (Assume I_F is still unchanged.)