Problem from book 5-29 as shown below.

5-29. A 100-hp 440-V 0.8-PF-leading Δ-connected synchronous motor has an armature resistance of 0.22 Ω and a synchronous reactance of 3.0 Ω. Its efficiency at full load is 89 percent.

(a) What is the input power to the motor at rated conditions?

(b) What is the line current of the motor at rated conditions? What is the phase current of the motor at rated conditions?

(c) What is the reactive power consumed by or supplied by the motor at rated conditions?

(d) What is the internal generated voltage $E_A$ of this motor at rated conditions?

(e) What are the stator copper losses in the motor at rated conditions?

(f) What is $P_{earr}$ at rated conditions?

(g) If $E_A$ is decreased by 10 percent, how much reactive power will be consumed by or supplied by the motor?