Quiz #5

MEMS 0051 - Introduction to Thermodynamics

Assigned: June 24$^{\text{th}}$, 2020
Due: June 25$^{\text{th}}$, 2020, 11:59 pm

Problem #1

You have been asked to evaluate a potential refrigerator for use in an industrial process. The refrigerator needs to be capable of condensing 2 [kg] of water at 101.3 [kPa], moving from saturated steam to saturated liquid water every 60 [s]. The inside of the refrigerator is kept at a stable temperature of -10 °C and rejects heat into a large room at a temperature of 35 °C. To prevent the temperature from increasing in the room, however, the refrigerator can reject heat at a rate of no more than 85 [kW]. Using the steam tables, answer the following:

(a) At what rate, $\dot{Q}_L$, does the heat need removed to condense the water?
(b) Is this refrigerator real, ideal, or impossible? Explain your answer.

Academic Integrity Statement:

I hereby attest that I have received no assistance (from a friend, from another student, from an on-line resource, such as Chegg, etc.), and that I have provided no assistance to another student, during this examination. All the work presented within is solely my own work.

Signature: _____

Date: _____