DREXEL UNIVERSITY
Department of Chemical and Biological Engineering
CHE 230 – Chemical Engineering Thermodynamics I
Winter 2024-2025 (202425)
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Midterm Exam – February 11, 2025

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1. (17 pts)

   Superheated steam at 3 MPa and 348.0°C is to be converted to saturated steam at 3 MPa in a desuperheater. This desuperheater is supplied with inlet liquid water at 50.0°C. The unit should produce saturated steam at a rate of 34.0 kg s^{-1}. Assuming adiabatic operation, and assuming the liquid inlet is saturated, what is the mass flowrate of the inlet water?

   The following enthalpies will be useful:

   Superheated steam at 348.0°C and 3 MPa: $\hat{H} = 3{,}105.83$ kJ/kg;

   Saturated liquid water at 50.0°C: $\hat{H}^{\mathrm{L}} = 209.33$ kJ/kg; and

   Saturated water vapor at 3 MPa: $\hat{H}^{\mathrm{V}} = 2{,}803.63$ kJ/kg.

2. (19 pts) True/False questions. Write "T" for "True" or "F" for "False" in the blank space.

   ___ A bear shits in the woods.

   ___ The pope is Freewill Southern Baptist.

   ___ The sky is blue.

   ___ Entropy is delicious.

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