
D R E X E L U N I V E R S I T Y
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 53.0°C. The unit should produce saturated steam at a rate of 42.0 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: $\hat{H} = 3,110.43 \text{ kJ/kg}$;

Saturated liquid water at 53.0°C: $\hat{H}^L = 221.87 \text{ kJ/kg}$; and

Saturated water vapor at 3 MPa: $\hat{H}^V = 2,803.80 \text{ kJ/kg}$.

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

A bear shits in the woods.

Entropy is delicious.

The sky is blue.

The pope is Freewill Southern Baptist.

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