

AME 20231

Homework 12

Due: Thursday, 21 April 2022, 9:00 AM, on Sakai

1. 9.30.
2. 12.37.
3. 12.51, for liquid water take instead $P = 2.4$ MPa. For water vapor, take instead $P = 350$ kPa.
4. 12.65.
5. A van der Waals gas with $R = 200$ J/kg/K, $a = 145$ Pa m⁶/kg², $b = 0.001$ m³/kg, $c_v = (350$ J/kg/K) $+ (0.2$ J/kg/K² $)(T - 300$ K) begins at $T_1 = 300$ K, $P_1 = 10^5$ Pa. It is isothermally compressed to state 2 for which $P_2 = 10^6$ Pa. It is then isochorically heated to state 3 for which $T_3 = 1000$ K. Find w_{13} , q_{13} , and $s_3 - s_1$. Assume the surroundings are at 1000 K.