Department of Materials Science and Engineering Pohang University of Science and Technology

AMSE205 Thermodynamics I

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Problem Set #5

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1. Derive the following, widely used thermodynamic equations.

(a) First <i>TdS</i> equation :	$TdS = C_V dT + T \left(\frac{\partial P}{\partial T}\right)_V dV$
(b) Second <i>TdS</i> equation :	$TdS = C_P dT - T \left(\frac{\partial V}{\partial T}\right)_P dP$
(c) First energy equation:	$\left(\frac{\partial U}{\partial V}\right)_T = T \left(\frac{\partial P}{\partial T}\right)_V - P$
(d) Second energy equation:	$\left(\frac{\partial U}{\partial P}\right)_T = -T \left(\frac{\partial V}{\partial T}\right)_P - P \left(\frac{\partial V}{\partial P}\right)_T$

2. Gaskell, Chap.6, Problems #1, 3, 5, 7, 9