

## Chemistry 2720 Fall 2003 Quiz 2

Name: \_\_\_\_\_

Industry sometimes uses flow-through reactors, which are basically tubes through which the reactants are pushed and in which they react. The temperature in a flow-through reactor can be made different at the two ends simply by heating one end or cooling the other, or both. Suppose that benzene is hydrogenated to form cyclohexane in a flow-through reactor. The reactants benzene and hydrogen enter the reactor at a temperature of 550 K (well above the boiling point of benzene) and the product cyclohexane exits the reactor at 1290 K (again, well above the b.p. of  $C_6H_{12}$ ). The pressure is constant throughout. How much heat is liberated per mole of benzene hydrogenated under these conditions?

To convert degrees Celsius to Kelvin, add 273.15.

STANDARD THERMODYNAMIC DATA AT 25°C		
Species	$\Delta\bar{H}_f^\circ$ (kJ/mol)	$\bar{C}_p$ (J K <sup>-1</sup> mol <sup>-1</sup> )
C <sub>6</sub> H <sub>6(g)</sub> (benzene)	82.9	82.44
C <sub>6</sub> H <sub>12(g)</sub> (cyclohexane)	-123.1	105.3
H <sub>2(g)</sub>	0	28.84