Name_____KEY_____ Section_____ chm152 Quiz 1

1) (2 pts each) For the following chemical reactions and physical processes, determine if thermal energy (q) is entering the system (+) or leaving the system (-).

a, an ice cube melting (H_2O (s) → H_2O (l)) **POSITIVE**

b, steam condensing on your bathroom mirror (H_2O (g) → H_2O (l)) **NEGATIVE**

c, H_2 (g) + ½ O_2 (g) → H_2O (l) ΔH = -285.8 kJ/mol **NEGATIVE**

d, a sample of iron metal (T = 350 K) is placed in 1.0 L of water at 273 K **NEGATIVE**

2) (4 pts) A 0.05 mol sample of salt is dissolved in 500 g of water. The temperature of the water changes from 25.0 °C to 23.8 °C. What is ΔH for the dissolution of one mole of the salt? ($q = mS\Delta T$, S_{water} = 4.184 J/g °C)

q_{water} = (500 g)(4.184 J/g °C)(23.8 °C - 25.0 °C) = -2510.4 J

$q_{salt} = -q_{water}$ = +2510.4 J $\Delta H_{salt} = q_{salt}$ = +2510.4 J (for 0.05 mol!)

ΔH per mole = 2510.4 / 0.005 = **50208 J/mol**

3) (2 pts each) For the following examples, determine if entropy is increasing, decreasing, or stays the same.

a, H_2O (l) → H_2O (g) **INCREASES**

b, N_2O_4 (g) → 2 NO_2 (g) **INCREASES**

c, CO_2 (s) → CO_2 (g) **INCREASES**

d, Pb (s), 450 K → Pb (s), 300 K **DECREASES**