Chemistry 141 Name

Dr Cary Willard

Quiz 6a (20 points) March 13, 2012

1. (8 points)A 29.0 g lead weight, initially at 10.1oC, is submerged in 7.66 g of water at 52.6oC in an insulated container. What is the final temperature of both substances at thermal equilibrium. The specific heat of lead is 0.128 J/goC

Heat gained by lead = heat lost by water

1. (6 points) Consider the following generic reaction: 2A + 4B 🡪 6C + 10D, ΔH=161 kJ. Determine the value of ΔH for each of the following reactions
   1. 4 A + 8B 🡪 12C + 20D
   2. 3C + 5D 🡪 A + 2B
2. (6 points) Use Hess law to calculate , Δ Hrxn for the following reaction:

C(s) + H2O(g) 🡪 CO(g) + H2(g)

Use the following reactions and given Δ H’s

C(s) + O2(g) 🡪 CO2(g) Δ H = −393.5 kJ

2 CO(g) + O2(g) 🡪 2 CO2(g) Δ H = −566.0 kJ

2 H2(g) + O2(g) 🡪 2 H2O(g) ΔH = −483.6 kJ

C(s) + O2(g) 🡪 CO2(g) Δ H = −393.5 kJ

CO2(g) 🡪 CO(g) + ½ O2(g) Δ H = +566.0 kJ/2 = + 283.0 kJ

H2O(g) 🡪H2(g) + ½ O2(g) ΔH = +483.6 kJ/2 = + 241.8 kJ

C(s) + H2O(g) 🡪 CO(g) + H2(g) Δ H = −393.5 kJ + 283.0 kJ + 241.8 kJ = +131.3 kJ

Chemistry 141 Name

Dr Cary Willard

Quiz 6b (20 points) March 13, 2012

1. (8 points)A 35.8 g lead weight, initially at 15.1oC, is submerged in 8.31 g of water at 72.6oC in an insulated container. What is the final temperature of both substances at thermal equilibrium. The specific heat of lead is 0.128 J/goC

Heat gained by lead = heat lost by water

1. (6 points) Consider the following generic reaction: 2A + 4B 🡪 6C + 10D, ΔH=237 kJ. Determine the value of ΔH for each of the following reactions
   1. A + 2B 🡪 3C + 5D
   2. 12C + 20D 🡪 4A + 8B
2. (6 points) Use Hess law to calculate , Δ Hrxn for the following reaction:

C(s) + H2O(g) 🡪 CO(g) + H2(g)

Use the following reactions and given Δ H’s

C(s) + O2(g) 🡪 CO2(g) Δ H = −393.5 kJ

2 CO(g) + O2(g) 🡪 2 CO2(g) Δ H = −566.0 kJ

2 H2(g) + O2(g) 🡪 2 H2O(g) ΔH = −483.6 kJ

C(s) + O2(g) 🡪 CO2(g) Δ H = −393.5 kJ

CO2(g) 🡪 CO(g) + ½ O2(g) Δ H = +566.0 kJ/2 = + 283.0 kJ

H2O(g) 🡪H2(g) + ½ O2(g) ΔH = +483.6 kJ/2 = + 241.8 kJ

C(s) + H2O(g) 🡪 CO(g) + H2(g) Δ H = −393.5 kJ + 283.0 kJ + 241.8 kJ = +131.3 kJ