Grossmont College Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chemistry 102, Fall 2015

Quiz 4 (20 points) Date: \_\_\_\_\_\_\_\_\_\_\_\_

1. (10 points). An ice cube of mass 9.0 g at temperature 0 °C is added to a cup of coffee, whose temperature is 90 °C and which contains 110 g of liquid. Assume the specific heat capacity of coffee is the same as that of water (4.184 J/g °C). The heat of fusion of ice (the heat associated with ice melting) is 6.0 kJ/mol. Find the temperature of the coffee after the ice melts
2. (6 points) Pentaborane-9, B5H9, is a colorless, highly reactive liquid that will burst into flame when expoed to oxygen. The reaction is

2 B5H9(l) + 12 O2(g) 🡪 5 B2O3(s) + 9 H2O(l)

1. Calculate ΔHrxno
2. Calculate the amount of energy released when a 15.00 g simple of pentaborane-9 is burned in the presence of oxygen.
3. (4 points) Use bond energies to calculate the heat of reaction for CO2 + 2 NH3 🡪 NH2CONH2 + H2O The molecular structures are shown below:



ΔHfo, B5H9*(l)* = 73.2 kJ/mol ΔHfo, B2O3*(s)* = −1263.6 kJ/mol

ΔHfo, H2O*(l)* = −285.8 kJ/mol ΔHfo, H2O *(g)* = −-241.8 kJ/mol