CH 222
Sample Quiz #3 Name: _____ Lab Section: _____

Be sure to show all work, use the correct number of significant figures, circle final answers and use correct units in all problems.

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1. Provide the missing information: (4 points)

   A reaction "feels hot" as the chemicals react. *Sign* of ΔH: **positive** **negative** *circle one*

   A cold pack is needed after a sports injury. *Sign* of ΔH: **positive** **negative** *circle one*

   You watch some fireworks on the 4th of July. The fireworks are: **endothermic** **exothermic** *circle one*

   My reaction beaker forms ice on the outside as a reaction proceeds. The reaction is: **endothermic** **exothermic** *circle one*

2. Liquid water (45.0 g) is heated from 25.0 °C to 80.0 °C. (6 points)

   a. What is the heat capacity of liquid water (include units) (4 pts)

   b. Calculate q for heating the water in Joules.

   c. Calculate q for heating the water in kilojoules (kJ).

3. If 25 J are required to change the temperature of 5.0 g of substance A by 2.0 K, what is the specific heat of substance A? (4 points)

4. Determine ΔH for the following reaction,

   $N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$

   given the thermochemical equations below. (6 points)

   $N_2(g) + O_2(g) \rightarrow 2\ NO(g)$ $\Delta H = +180.8$ kJ

   $4\ NH_3(g) + 5\ O_2(g) \rightarrow 4\ NO(g) + 6\ H_2O(g)$ $\Delta H = -906.2$ kJ

   $2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(g)$ $\Delta H = -483.6$ kJ

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Answers

1. Provide the missing information: (4 points)

   negative
   positive
   exothermic
   endothermic

2. Liquid water (45.0 g) is heated from 25.0 °C to 80.0 °C. (6 points)

   4.184 J/g °C
   1.04×10^4 J
   10.4 kJ

3. If 25 J are required to change the temperature of 5.0 g of substance A by 2.0 K, what is the specific heat of substance A? (4 points)

   2.5 J/gK

5. Determine ΔH for the following reaction,
   $N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$
   given the thermochemical equations below. (6 points)

   $N_2(g) + O_2(g) \rightarrow 2\ NO(g)$ $\Delta H = +180.8$ kJ
   $4\ NH_3(g) + 5\ O_2(g) \rightarrow 4\ NO(g) + 6\ H_2O(g)$ $\Delta H = -906.2$ kJ
   $2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(g)$ $\Delta H = -483.6$ kJ

   ΔH = -91.5 kJ