Self Assessment A

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This assignment is due on January 27 2012, 12:45 PM EST.

Question 1

An exothermic reaction causes the surroundings to:

- **A)** become basic
- **B)** decrease in temperature
- **C)** condense
- **D)** increase in temperature
- **E)** decrease in pressure

Question 2

How much heat is evolved when 320 g of SO_2 is burned according to the chemical equation shown below?

$2\ SO_2(g) + O_2(g) \text{ ----> } 2\ SO_3(g)\ \Delta H^o_{rxn} = -198\ kJ$

- **A)** 5.04×10^{-2} kJ
- **B)** 9.9×10^{2} kJ
- **C)** 207 kJ
- **D)** 5.0×10^{2} kJ
- **E)** None of the above

Question 3

The specific heat of aluminum is 0.214 cal/g·°C. Determine the energy, in calories, necessary to raise the temperature of a 55.5 g piece of aluminum from 23.0 to 48.6°C.

- **A)** 109 cal
- **B)** 273 cal
- **C)** 577 cal
- **D)** 347 cal
- **E)** 304 cal

Question 4

A 60.0 g sample of an alloy was heated to 96.00°C and then dropped into a beaker containing 87.0 g of water at a temperature of 24.10°C. The temperature of the water rose to a final temperature of 27.63°C. The specific heat of water is 4.184 J/g·°C. What is the specific heat of the alloy?

- **A)** 0.313 J/g·°C
- **B)** 2.16 J/g·°C
- **C)** 0.118 J/g·°C
- **D)** 1.72 J/g·°C
- **E)** None of the above

Question 5

When 1.535 g of methanol (CH_3OH) was burned in a constant-volume bomb calorimeter, the water temperature rose from 20.27°C to 26.87°C. If the mass of water surrounding the calorimeter was exactly 1000 g and the heat capacity of the bomb calorimeter was 1.75 kJ/°C, calculate the molar heat of combustion of CH_3OH. The specific heat of water is 4.184 J/g·°C.

- **A)** -8.17×10^{5} kJ/mol
- **B)** -817 kJ/mol
- **C)** 1.88 kJ/mol
- **D)** 817 kJ/mol
- **E)** None of the above

Question 6

To which one of the following reactions, occurring at 25°C, does the symbol $\Delta H^o_f\ [H_2SO_4(l)]$ refer?

- **A)** $H_2(g) + S(s) + 2\ O_2(g) \text{ ----> } H_2SO_4(l)$
- **B)** $H_2SO_4(l) \text{ ----> } H_2(g) + S(s) + 2\ O_2(g)$
- **C)** $H_2(g) + S(g) + 2\ O_2(g) \text{ ----> } H_2SO_4(l)$
- **D)** $H_2SO_4(l) \text{ ----> } 2\ H(g) + S(s) + 4\ O(g)$
- **E)** $2\ H(g) + S(g) + 4\ O(g) \text{ ----> } H_2SO_4(l)$

Question 7

Given: $SO_2(g) + \frac{1}{2}O_2(g) \text{ ----> } SO_3(g)\ \Delta H^o_{rxn} = -99$ kJ, what is the enthalpy change for the following reaction?

$2\ SO_3(g) \text{ ----> } O_2(g) + 2\ SO_2(g)$

- **A)** 99 kJ
- **B)** -99 kJ
- **C)** 49.5 kJ
- **D)** -198 kJ
- **E)** 198 kJ