

## Chapter 5 Thermochemistry Summary/Prequiz

1. 4. Calculate the kinetic energy (J) of a 150 lb jogger (68.1 kg) traveling at 12.0 mile/hr (5.36 m/s).
- a)  $1.96 \times 10^3$
  - b) 365
  - c) 978
  - d) 183
  - e) 68.1

2. What is the  $\Delta E$  (in J) of a system that releases 12.4 J of heat and does 4.2 J of work on the surroundings?
- a) 16.6
  - b) 12.4
  - c) 4.2
  - d) -16.6
  - e) -8.2

3. Which one of the following conditions would always result in an increase in E of a system?
- a) The system loses heat and does work on the surroundings.
  - b) The system gains heat and does work on the surroundings.
  - c) The system loses heat and has work done on it by the surroundings.
  - d) The system gains heat and has work done on it by the surroundings.
  - e) None of these is correct.

4. The value of  $\Delta H^\circ$  for the reaction below is -72 kJ. How many kJ of heat will be evolved when 1.0 mol of HBr is formed in this reaction?
- $$\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightarrow 2\text{HBr}(\text{g})$$
- a) 144
  - b) 72
  - c) 0.44
  - d) 36
  - e) -72

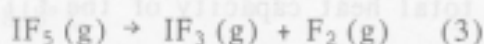
5.

If the molar heat capacity of a compound with the formula  $C_2H_6SO$  is 88.0 J/mol-K, what is the specific heat (in J/g-K) of this substance?

- a) 88.0
- b) 1.13
- c) 4.89
- d)  $6.88 \times 10^3$
- e) -88.0

6.

The  $\Delta H^\circ$  for reactions 1 and 2 are -390 kJ and -745 kJ, respectively.  $\Delta H^\circ$  for reaction 3 is \_\_\_\_\_ kJ.



- a) +355
- b) -1135
- c) +1135
- d) +35
- e) -35

7.

Calculate  $\Delta H_{rxn}^\circ$  (in kJ/mol) for:



Substance	$\Delta H_f^\circ$ (kJ/mol)
$Ca(OH)_2$	-986.6
$H_3AsO_4$	-900.4
$Ca(H_2AsO_4)_2$	-2346.0
$H_2O$	-258.9

- a) -744.9
- b) -4519
- c) -4219
- d) -130.4
- e) -76.4

8.

50.0 mL of 1.0 M HCl were mixed with 50.0 mL of 1.00 M NaOH in a coffee cup calorimeter. The resulting solution changed temperature from 23.0°C to 29.8°C. Which one of the following is not true concerning this experiment? Assume the resulting solution had the density and specific heat of pure water, i.e., 1.00 g/mL and 4.18 J/g-K, respectively.

- a) The reaction was exothermic.
- b) 2.8 kJ of heat were transferred during the process.
- c) For this reaction,  $q_{rxn} = -2.8$  kJ.
- d) The heat flow was measured under condition of constant pressure.
- e) 1.4 kJ of heat were transferred during the process.