

Enthalpy Changes and Calorimetry

Time: 20 min. 6 questions.

Instructions

Answer all six questions. For multiple choice, select the best answer. For short answer, write a complete sentence or brief explanation. For true or false, write the word True or False and correct any false statement. For numeric questions, show your calculation and include units in your final answer.

Questions

1. Enthalpy is best defined as:

- A) the total kinetic energy of all particles in a system
- B) the heat content of a system at constant pressure
- C) the rate at which a chemical reaction proceeds
- D) the energy required to break all bonds in a molecule

[\(Outcome\)](#)

2. True or false: A negative value for ΔH indicates an exothermic reaction.

[\(Outcome\)](#)

3. In a calorimetry experiment, 50.0 mL of 2.0 mol/L hydrochloric acid is mixed with 50.0 mL of 2.0 mol/L sodium hydroxide solution in an insulated cup. The temperature of the mixture rises from 21.0°C to 28.5°C. Assuming the density and specific heat capacity of the solution are 1.0 g/mL and 4.18 J/(g·°C) respectively, calculate the heat released by this neutralization reaction in joules.

[\(Outcome\)](#)

4. Which of the following statements correctly describes the relationship between heat transfer and the variables in $Q = mc\Delta T$

- A) Heat transfer is inversely proportional to mass and temperature change
- B) Heat transfer is directly proportional to mass, specific heat capacity, and temperature change
- C) Heat transfer depends only on the specific heat capacity of the substance
- D) Heat transfer is independent of the temperature change in the system

[\(Outcome\)](#)

5. Explain the difference between enthalpy (ΔH) and internal energy (ΔU) in a calorimetry experiment.

[\(Outcome\)](#)

6. What is the specific heat capacity of a substance if 2500 J of heat energy raises the temperature of 100 g of the substance by 5°C?

[\(Outcome\)](#)

Curriculum Coverage

Question	Outcome Alias	Outcome Description
1	Outcome	Define enthalpy and molar enthalpy for chemical reactions
2	Outcome	Use and interpret ΔH , ΔU and ΔG to communicate and calculate energy changes

