

AP Chemistry
Chapter 8 MiniTest

Name Key

Multiple Choice: Place the letter of the best answer in the space at the left.

- D 1. Which of the following statements are true regarding an endothermic reaction?
 (1) The ΔH of the reaction is a positive quantity. T
 (2) The temperature of the surroundings decreases as the reaction proceeds. T
 (3) The enthalpy of the reaction system decreases. F
 (4) The products have a higher enthalpy than the reactants. T

(A) only 1 and 3 (B) only 2 and 4 (C) only 1, 2, and 3 (D) only 1, 2, and 4

- B 2. The heat of vaporization of water is +40.7 kJ/mole. How much energy would be released by the condensation of 2.00 grams of steam?

(A) 2.26 kJ (B) 4.52 kJ (C) 20.3 kJ (D) 81.4 kJ

$\frac{2}{40.7} = \frac{15}{40.7}$
~~300.9~~
~~40.7~~
 (1 ml)

- C 3. Which of the following data are NOT required for calculating the ΔH of dissolving one mole of solid by doing a "coffee-cup" calorimeter experiment?

- (A) temperature change of the water
 (B) mass of the water
 (C) atmospheric pressure
 (D) mass of the dissolved sample
 (e) specific heat of water

$(1.5)(4.18)(2.44) = 12.75 \text{ J}$

- B 4. When 1.75 g of CaCl_2 dissolves in 125 g of water in a coffee-cup calorimeter, the temperature increases by 2.44°C . What is the heat of solution (ΔH for the dissolving reaction) of CaCl_2 ? (c for water = $4.18 \text{ J/g}\cdot^\circ\text{C}$).

(A) -1.27 kJ (B) -80.9 kJ (C) $+1.27 \text{ kJ}$ (D) $+80.9 \text{ kJ}$

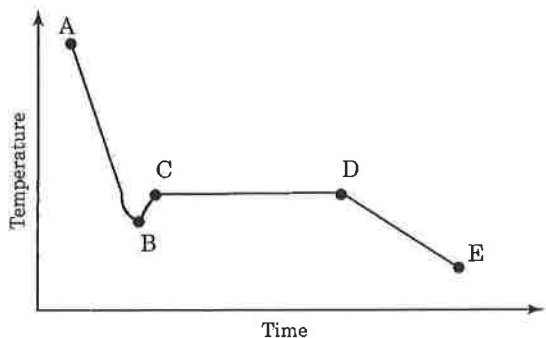
$\frac{-12.75 \text{ J}}{1.75 \text{ g}} = 111.3$

- B 5. If the same amount of heat is added to 1.00 g of each of the following substances, which substance will undergo the largest temperature change?

	Substance	Specific Heat ($\text{J/g}\cdot^\circ\text{C}$)
(A)	$\text{Al}(s)$	0.90
(B)	$\text{Cl}_2(g)$	0.48
(C)	$\text{C}_6\text{H}_6(l)$	1.7
(D)	$\text{H}_2\text{O}(l)$	4.2
(E)	$\text{NaCl}(s)$	0.87

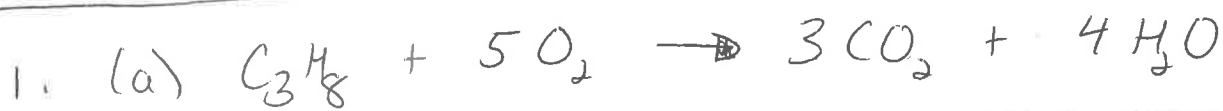
$q = mc\Delta T$
 $\frac{q}{mc} = \Delta T$
 $\Delta T \propto \frac{1}{c}$

- D 6. The cooling curve for a liquid substance is shown below. The part that represents only the solid phase is



- (A) point C only
 (B) point D only
 (C) all points between C and D
 (D) all points between D and E

CHAP 8 MINITEST



(b) Use a proportion. Balanced equation is for 1 mole of propane

$$\frac{-50.30 \text{ kJ}}{1.00 \text{ g } C_3H_8} = \frac{x}{44.0 \text{ g } C_3H_8} \quad x = -2213 \text{ kJ}$$

(1 mole)

So $\Delta H = -2213 \text{ kJ}$

(c) ABBY + ALEXANDRA - It was correct w/ 75.0 g of ice/water.

The heat is 50.30, not 2213. ("heat released by the propane sample.")

SO: Work problem w/ 75.0 g!

heat released is absorbed by ice to melt & warm water -

$$+ 50.30 \text{ kJ} \Rightarrow \text{melt ice} + \text{warm water}$$

Use heat of fusion for melting. 75.0 g ~~water~~ = 4.17 moles

$$4.17 \text{ moles} \times \frac{6.00 \text{ kJ}}{\text{mole}} = 25 \text{ kJ absorbed to melt ice}$$

CHANGE TO JOULES!

$$50,300 \text{ J} = 25,000 \text{ J} + m c \Delta T$$

$$25,300 \text{ J} = (75.0 \text{ g}) (4.18 \text{ J/g}^\circ\text{C}) \Delta T$$

Water is warming

$$\Delta T = 80.7^\circ$$

(It still sits pretty hot!)

(d) $\Delta H_{rxn} = \sum \Delta H_f (\text{prod}) - \sum \Delta H_f (\text{react})$ solve for this

$$-2213 \text{ kJ} = [3(-393.5) + 4(-285.8)] - [\Delta H_f(C_3H_8) - 5(0.0)]$$

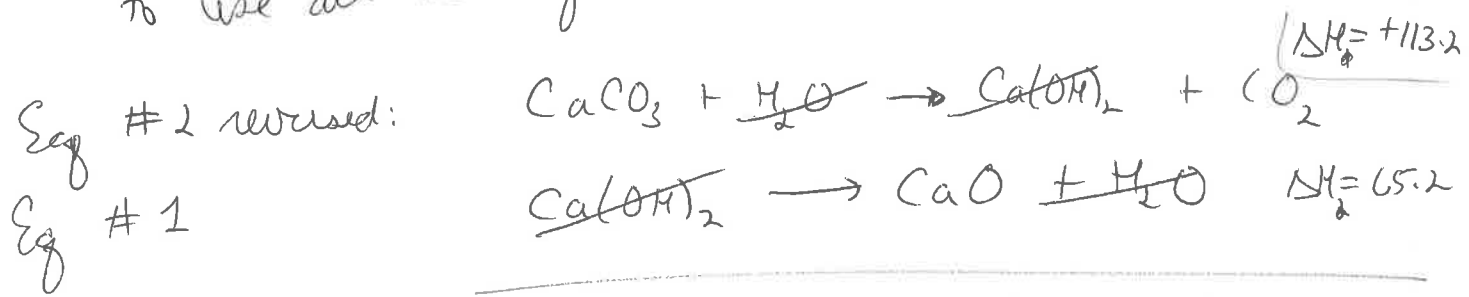
from part (b)

$$\Delta H_f = -110.7 \text{ kJ/mole}$$

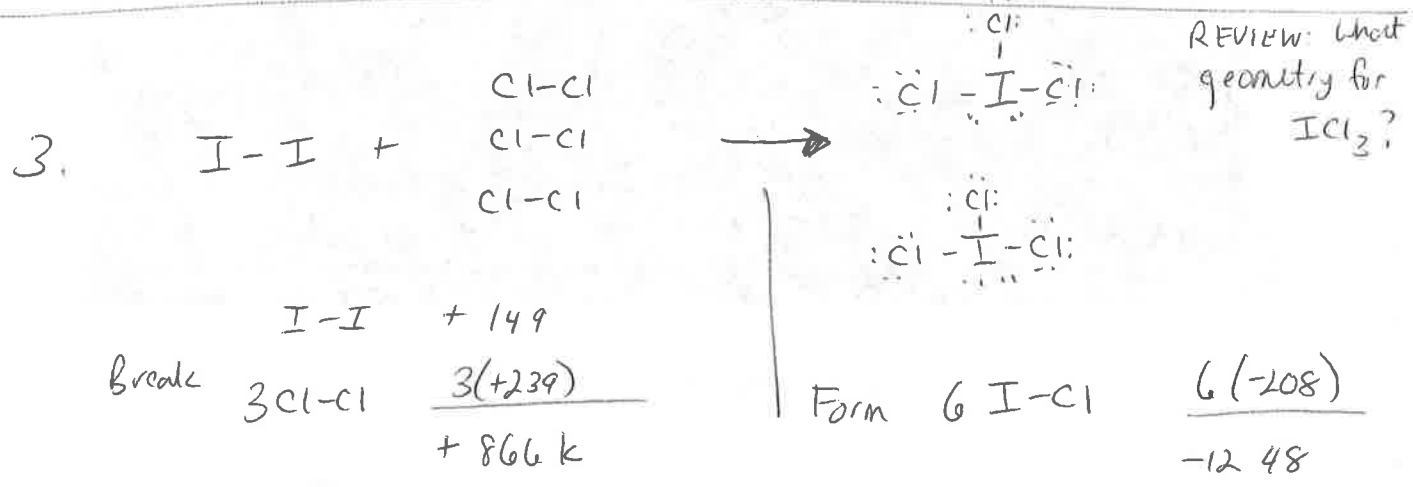
for C_3H_8

CNAPS MINITEST 1

2. Unusual example of Hess's law - you don't need to use all the equations.



$\Delta H = 178.4 \text{ kJ}$



$\Delta H = -382 \text{ kJ}$