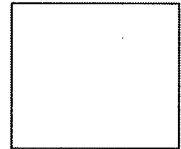


CHEM 123

Quiz 2A

Name (*Please print*): _____ *Key* _____

UBC student number: _____



Please put **FIRST**
LETTER of **LAST**
NAME in this box.

Total number of marks: 7 (1 mark each unless indicated!)

Standard UBC Exam guidelines apply for this quiz. No talking and no study aids. **A calculator is permitted!**

Circle the correct answer for each question - there is ONE correct answer for each question!

The space below is left blank for you to use as "scrap paper" for calculations.

1. Which of the following terms can be correctly associated with enthalpy?

- i. Heat under constant pressure conditions
- ii. Extensive quantity
- iii. Path independent

(A) (ii) and (iii) (C) (ii) only (E) (i) and (iii)
 (B) (iii) only (D) (i), (ii) and (iii)

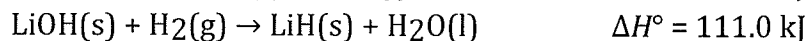
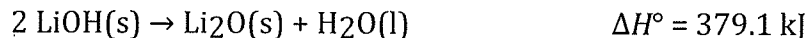
2. The combustion of 4.54 g of Sucrose in a piston releases 75 kJ of energy. 62 kJ of the energy is absorbed by the surroundings, and the rest is used to expand the volume of the piston. Determine ΔU , q , and w for the system.

- (A) $\Delta U = +75$ kJ, $w = +137$ kJ, and $q = -62$ kJ
 (B) $\Delta U = +75$ kJ, $w = +13$ kJ, and $q = +62$ kJ
 (C) $\Delta U = -75$ kJ, $w = -13$ kJ, and $q = -62$ kJ
 (D) $\Delta U = -75$ kJ, $w = -137$ kJ, and $q = +62$ kJ
 (E) $\Delta U = -137$ kJ, $w = -62$ kJ, and $q = -75$ kJ

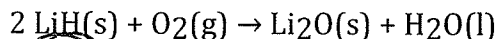
3. A certain chemical reaction absorbs 10.1 kJ of heat under constant volume conditions and absorbs 8.4 kJ of heat under constant pressure conditions. What is the sign and magnitude of work performed under constant pressure conditions?

- (A) -8.4 kJ (C) -1.7 kJ (E) +10.1 kJ
 (B) +1.7 kJ (D) -10.1 kJ

4. [2 MARKS] Use the following reactions:

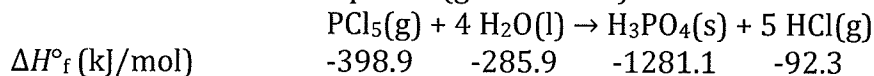


To determine ΔH° for the reaction:



- (A) +125.2 kJ (C) -128.8 kJ (E) +128.8 kJ
 (B) -17.8 kJ (D) -303.6 kJ

5. [2 MARKS] Determine ΔH° for the following reaction using the enthalpy of formation values for each species (given below).



- (A) -688.6 kJ (C) -74.9 kJ (E) -900.3 kJ
 (B) -200.1 kJ (D) -1000.6 kJ

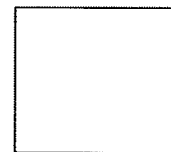
END OF QUIZ

CHEM 123

Quiz 2B

Name (*Please print*): _____ *Key* _____

UBC student number: _____



Please put **FIRST LETTER** of **LAST NAME** in this box.

Total number of marks: 7 (1 mark each unless indicated!)

Standard UBC Exam guidelines apply for this quiz. No talking and no study aids. **A calculator is permitted!**

Circle the correct answer for each question - there is ONE correct answer for each question!

The space below is left blank for you to use as "scrap paper" for calculations.

1. Which of the following terms can be correctly associated with enthalpy?
- Heat under constant volume conditions
 - Extensive quantity
 - Path independent
- (A) (ii) and (iii) (C) (ii) only (E) (i) and (iii)
 (B) (iii) only (D) (i), (ii) and (iii)
2. The combustion of one mole of methane in a piston releases 802 kJ of energy. 150 kJ of this energy was used to expand the piston while the rest went into heating the surroundings. Determine ΔU , q , and w for the **system**.
- (A) $\Delta U = +802$ kJ, $w = -150$ kJ, and $q = -652$ kJ
 (B) $\Delta U = +802$ kJ, $w = +150$ kJ, and $q = +652$ kJ
 (C) $\Delta U = -802$ kJ, $w = -150$ kJ, and $q = -652$ kJ
 (D) $\Delta U = -802$ kJ, $w = -150$ kJ, and $q = +652$ kJ
 (E) $\Delta U = -952$ kJ, $w = -150$ kJ, and $q = -802$ kJ
3. A certain chemical reaction absorbs 10.1 kJ of energy at constant volume and absorbs 8.4 kJ at constant pressure. What is ΔU for the reaction?
- (A) -8.4 kJ (C) -1.7 kJ (E) +10.1 kJ
 (B) +8.4 kJ (D) -10.1 kJ
4. [2 MARKS] Use the following reactions:
- | | |
|---|-------------------------------|
| $2 \text{NOCl(g)} \rightarrow 2 \text{NO(g)} + \text{Cl}_2\text{(g)}$ | $\Delta H^\circ = +75.56$ kJ |
| $2 \text{NO(g)} + \text{O}_2\text{(g)} \rightarrow 2 \text{NO}_2\text{(g)}$ | $\Delta H^\circ = -113.05$ kJ |
| $2 \text{NO}_2\text{(g)} \rightarrow \text{N}_2\text{O}_4\text{(g)}$ | $\Delta H^\circ = -58.03$ kJ |
- To determine ΔH° for the reaction:
- $$\text{N}_2\text{O}_4\text{(g)} + \text{Cl}_2\text{(g)} \rightarrow 2 \text{NOCl(g)} + \text{O}_2\text{(g)}$$
- (A) 246.65 kJ (C) 95.52 kJ (E) 20.54 kJ
 (B) -95.52 kJ (D) -246.65 kJ
5. [2 MARKS] Compute ΔH° for the following reaction given the enthalpy of formation values for each species (given below).
- | | |
|-----------------------------|---|
| | $\text{CO}_2\text{(g)} + 2 \text{HCl(g)} \rightarrow \text{COCl}_2\text{(g)} + \text{H}_2\text{O(l)}$ |
| ΔH°_f (kJ/mol) | -393.51 -92.30 -223.01 -285.85 |
- (A) -994.67 kJ (C) -23.05 kJ (E) -69.25 kJ
 (B) 23.05 kJ (D) 69.25 kJ

END OF QUIZ