

Chapter 13 Worksheet 1

Name:

UGA ID:

Instructions:

- Please enter your first and last name as it appears on the eLC roster (do not use a nickname).
- Your UGA myID is a combination of letters and numbers (example: mine is sre13137). **Do not use your 81x number.**
- Type your answers in the then upload the worksheet template to Gradescope by 11:59 p.m. on Friday, September 18. There is no work to turn in.

1. If bonds are stronger in the products than in the reactants, ΔH is:

- A. Negative (exothermic reaction)
- B. Positive (exothermic reaction)
- C. Negative (endothermic reaction)
- D. Positive (endothermic reaction)

2. Predict which substance has the higher entropy. Assume one mole of each substance.

- A. CO(g) at 25 °C and 1 atm
- B. Hg(l) at 25 °C and 1 atm
- C. No difference

3. Which of the following has the largest entropy?

- A. 0.1 mole N₂ solid at -250 °C and 1 atm
- B. 0.1 mole N₂ gas at 50 °C and 1 atm
- C. 0.1 mole N₂ liquid at -200 °C and 1 atm
- D. A difference in entropy cannot be detected.

4. Which of the following has the most favorable change in entropy for 0.1 mole of the starting material at 1 atm?

- A. $\text{N}_2(\text{l}) \rightarrow \text{N}_2(\text{s})$
- B. $\text{N}_2(\text{g}) \rightarrow \text{N}_2(\text{s})$
- C. $\text{N}_2(\text{s}) \rightarrow \text{N}_2(\text{l})$
- D. A difference in entropy cannot be detected.

5. Predict which substance has the higher entropy. Assume one mole of each substance.

- A. $\text{CH}_3\text{OH}(\text{l})$ at 25 °C and 1 atm
- B. $\text{CH}_3\text{CH}_2\text{OH}(\text{l})$ at 25 °C and 1 atm
- C. No difference

6. Which of the following has the most favorable change in entropy at 25 °C and 1 atm?

- A. $\text{K}_2\text{S}(\text{s}) \rightarrow 2 \text{K}^+(\text{aq}) + \text{S}^{2-}(\text{aq})$
- B. $\text{KBr}(\text{s}) \rightarrow \text{K}^+(\text{aq}) + \text{Br}^-(\text{aq})$
- C. $\text{K}_3\text{PO}_4(\text{s}) \rightarrow 3 \text{K}^+(\text{aq}) + \text{PO}_4^{3-}(\text{aq})$
- D. A difference in entropy cannot be detected.

7. Predict which substance has the higher entropy. Assume one mole of each substance.

- A. $\text{CaS}(\text{s})$ at 25 °C and 1 atm
- B. $\text{KI}(\text{s})$ at 25 °C and 1 atm
- C. No difference

8. Which of the following has the larger number of possible microstates?

- A. 0.25 mole He gas at 50 °C and 1 atm
- B. 0.25 mole He gas at 25 °C and 1 atm
- C. No difference

9. Which of the following has the larger number of possible microstates?

- A. 1 mole N_2 gas at 1 atm and 25 °C
- B. 1 mole N_2 gas at 0.001 atm and 25 °C
- C. No difference

10. Predict the sign ΔS_{sys} for iodine vapor condensing on a cold surface

- A. -
- B. +
- C. No difference

11. Which of the following processes have a $\Delta S > 0$?

- A. $\text{CH}_3\text{OH}(\text{l}) \rightarrow \text{CH}_3\text{OH}(\text{s})$
- B. $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightarrow 2 \text{NH}_3(\text{g})$
- C. $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{CO}(\text{g}) + 3 \text{H}_2(\text{g})$
- D. $\text{Na}_2\text{CO}_3(\text{s}) + \text{H}_2\text{O}(\text{g}) + \text{CO}_2(\text{g}) \rightarrow 2 \text{NaHCO}_3(\text{s})$
- E. All of the above processes have a $\Delta S > 0$.

12. Place the following in order of increasing entropy at 298 K.

$\text{C}_2\text{H}_6(\text{g})$, $\text{Pb}(\text{s})$, $\text{Mg}(\text{s})$, $\text{CH}_4(\text{g})$

- A. Mg, Pb, C_2H_6 , CH_4
- B. C_2H_6 , CH_4 , Pb, Mg
- C. Pb, Mg, CH_4 , C_2H_6
- D. Mg, Pb, CH_4 , C_2H_6
- E. Pb, Mg, C_2H_6 , CH_4