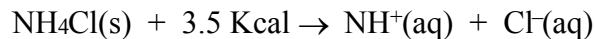


1. In terms of entropy and energy, systems in nature tend to undergo changes toward
- A) lower entropy and lower energy
 - B) lower entropy and higher energy
 - C) higher entropy and lower energy
 - D) higher entropy and higher energy
2. Systems in nature tend to undergo changes toward
- A) lower energy and higher entropy
 - B) lower energy and lower entropy
 - C) higher energy and higher entropy
 - D) higher energy and lower entropy
3. Which equation represents a change that results in an increase in disorder?
- A) $I_2(s) \rightarrow I_2(g)$
 - B) $CO_2(g) \rightarrow CO_2(s)$
 - C) $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$
 - D) $2H_2(g) + O_2(g) \rightarrow 2H_2O(\ell)$
4. The entropy of a sample of CO_2 increases as the CO_2 changes from
- A) gas to liquid
 - B) gas to solid
 - C) liquid to solid
 - D) solid to gas
5. The entropy of a sample of H_2O increases as the sample changes from a
- A) gas to a liquid
 - B) gas to a solid
 - C) liquid to a gas
 - D) liquid to a solid
6. Systems in nature tend to undergo changes toward
- A) lower energy and lower entropy
 - B) lower energy and higher entropy
 - C) higher energy and lower entropy
 - D) higher energy and higher entropy
7. Which 1-mole sample has the *least* entropy?
- A) $Br_2(s)$ at 266 K
 - B) $Br_2(\ell)$ at 266 K
 - C) $Br_2(\ell)$ at 332 K
 - D) $Br_2(g)$ at 332 K
8. Systems in nature tend to undergo changes toward
- A) lower energy and less disorder
 - B) lower energy and more disorder
 - C) higher energy and less disorder
 - D) higher energy and more disorder
9. Which of these changes produces the greatest increase in entropy?
- A) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$
 - B) $2 Mg(s) + O_2(g) \rightarrow 2 MgO(s)$
 - C) $H_2O(g) \rightarrow H_2O(\ell)$
 - D) $CO_2(g) \rightarrow CO_2(s)$
10. Which reaction has the greatest increase in entropy?
- A) $2 H_2O(\ell) \rightarrow 2 H_2(g) + O_2(g)$
 - B) $2 H_2O(g) \rightarrow 2 H_2(g) + O_2(g)$
 - C) $H_2O(g) \rightarrow H_2O(\ell)$
 - D) $H_2O(\ell) \rightarrow H_2O(s)$
11. Which equation shows an increase in entropy?
- A) $CO_2(g) \rightarrow CO_2(s)$
 - B) $CO_2(\ell) \rightarrow CO_2(g)$
 - C) $CH_3OH(\ell) \rightarrow CH_3OH(s)$
 - D) $CH_3OH(g) \rightarrow CH_3OH(\ell)$
12. In terms of energy and entropy, systems in nature tend to undergo changes toward
- A) higher energy and higher entropy
 - B) higher energy and lower entropy
 - C) lower energy and higher entropy
 - D) lower energy and lower entropy
13. Given the reaction:
- $$2 Na(s) + Cl_2(g) \rightarrow 2 NaCl(s)$$
- As the reactants form products, the entropy of the chemical system will
- A) decrease
 - B) increase
 - C) remain the same
14. Which reaction results in an increase in entropy?
- A) $CO_2(g) \rightarrow CO_2(s)$
 - B) $H_2O(\ell) \rightarrow H_2O(s)$
 - C) $Ca(s) + 2 H_2O(\ell) \rightarrow Ca(OH)_2(aq) + H_2(g)$
 - D) $NaCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

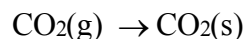
15. As products are formed in the reaction:



the entropy of the system

- A) decreases and heat is absorbed
- B) decreases and heat is released
- C) increases and heat is absorbed
- D) increases and heat is released

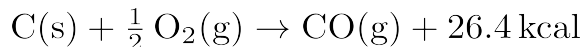
16. Given the change of phase:



As $\text{CO}_2(\text{g})$ changes to $\text{CO}_2(\text{s})$, the entropy of the system

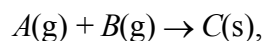
- A) decreases
- B) increases
- C) remains the same

17. Which phrase best describes the reaction below?



- A) exothermic with an increase in entropy
- B) exothermic with a decrease in entropy
- C) endothermic with an increase in entropy
- D) endothermic with a decrease in entropy

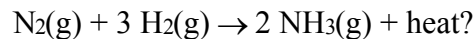
18. As the reactants are converted to product in the reaction



the entropy of the system

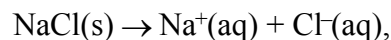
- A) decreases
- B) increases
- C) remains the same

19. Which type of reaction is the Haber process,



- A) exothermic, with an increase in entropy
- B) exothermic, with a decrease in entropy
- C) endothermic, with an increase in entropy
- D) endothermic, with a decrease in entropy

20. As NaCl(s) dissolves according to the equation



the entropy of the system

- A) decreases
 - B) increases
 - C) remains the same
-