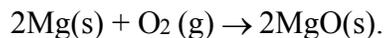


Do Now Unit 9 Kinetics & equilibrium

1. As the temperature of a chemical reaction in the gas phase is increased, the rate of the reaction increases because
 - A) fewer particle collisions occur
 - B) more effective particle collisions occur**
 - C) the required activation energy increases
 - D) the concentration of the reactants increases
2. A reaction is most likely to occur when reactant particles collide with
 - A) proper energy, only
 - B) proper orientation, only
 - C) both proper energy and proper orientation**
 - D) neither proper energy nor proper orientation
3. A piece of Mg(s) ribbon is held in a Bunsen burner flame and begins to burn according to the equation:



The reaction begins because the reactants

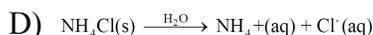
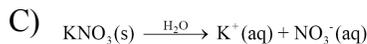
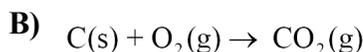
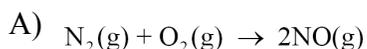
- A) are activated by heat from the Bunsen burner flame**
 - B) are activated by heat from the burning magnesium
 - C) underwent an increase in entropy
 - D) underwent a decrease in entropy
4. The energy needed to start a chemical reaction is called
 - A) potential energy
 - B) kinetic energy
 - C) activation energy**
 - D) ionization energy
 5. As the number of effective collisions between reacting particles increases, the rate of reaction
 - A) decreases
 - B) increases**
 - C) remains the same
 6. Given the reaction:
$$\text{Mg} + 2 \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2 + \text{H}_2$$
At which temperature will the reaction occur at the greatest rate?
 - A) 25°C
 - B) 50°C
 - C) 75°C
 - D) 100°C**

7. Which conditions will increase the rate of a chemical reaction?
 - A) decreased temperature and decreased concentration of reactants
 - B) decreased temperature and increased concentration of reactants
 - C) increased temperature and decreased concentration of reactants
 - D) increased temperature and increased concentration of reactants**
8. A 5.0-gram sample of zinc and a 50.-milliliter sample of hydrochloric acid are used in a chemical reaction. Which combination of these samples has the fastest reaction rate?
 - A) a zinc strip and 1.0 M HCl(aq)
 - B) a zinc strip and 3.0 M HCl(aq)
 - C) zinc powder and 1.0 M HCl(aq)
 - D) zinc powder and 3.0 M HCl(aq)**
9. Given the reaction:
$$\text{Fe}(s) + 2 \text{HCl}(aq) \rightarrow \text{FeCl}_2(aq) + \text{H}_2(g)$$
In this reaction, 5 grams of powdered iron will react faster than a 1-gram piece of solid iron because the powdered iron
 - A) has less surface area
 - B) has more surface area**
 - C) is less dense
 - D) is more dense
10. Given the balanced equation representing a phase change:
$$\text{C}_6\text{H}_4\text{Cl}_2(s) + \text{energy} \rightarrow \text{C}_6\text{H}_4\text{Cl}_2(g)$$
Which statement describes this change?
 - A) It is endothermic, and entropy decreases.
 - B) It is endothermic, and entropy increases.**
 - C) It is exothermic, and entropy decreases.
 - D) It is exothermic, and entropy increases.
11. The activation energy of a chemical reaction can be *decreased* by the addition of
 - A) a catalyst**
 - B) an indicator
 - C) electrical energy
 - D) thermal energy

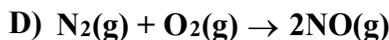
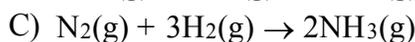
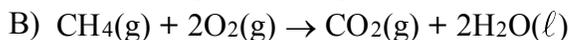
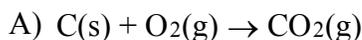
12. When a given salt is dissolved in water, the temperature of the water decreases. What does this temperature change indicate about the dissolving of the salt in water?

- A) **It is an endothermic reaction because it absorbs heat.**
- B) It is an endothermic reaction because it releases heat.
- C) It is an exothermic reaction because it absorbs heat.
- D) It is an exothermic reaction because it releases heat.

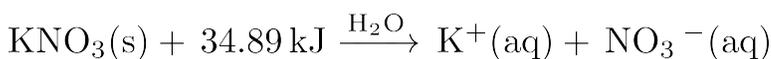
13. Which equation represents an exothermic reaction at 298 K?



14. Which balanced equation represents an endothermic reaction?



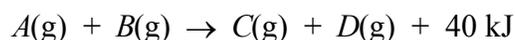
15. Given the balanced equation:



Which statement best describes this process?

- A) **It is endothermic and entropy increases.**
- B) It is endothermic and entropy decreases.
- C) It is exothermic and entropy increases.
- D) It is exothermic and entropy decreases.

16. The reaction



has a forward activation energy of 30 kJ. What is the activation energy for the reverse reaction?

- A) 10 kJ B) 30 kJ C) 40 kJ **D) 70 kJ**

17. The net energy released or absorbed during a reversible chemical reaction is equal to

- A) the activation energy of the endothermic reaction
- B) the activation energy of the exothermic reaction
- C) the difference between the potential energy of the products and the potential energy of the reactants**
- D) the sum of the potential energy of the products and the potential energy of the reactants

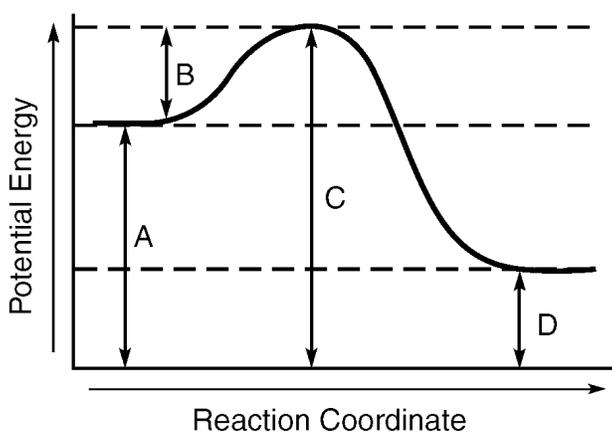
18. Changes in activation energy during a chemical reaction are represented by a

- A) cooling curve
- B) heating curve
- C) ionization energy diagram
- D) potential energy diagram**

19. In a chemical reaction, the difference between the potential energy of the products and the potential energy of the reactants is defined as the

- A) activation energy
- B) ionization energy
- C) heat of reaction**
- D) heat of vaporization

20. The potential energy diagram below represents a reaction.



Which arrow represents the activation energy of the forward reaction?

- A) *A*
- B) *B***
- C) *C*
- D) *D*

21. Which quantities must be equal for a chemical reaction at equilibrium?

- A) the activation energies of the forward and reverse reactions
- B) the rates of the forward and reverse reactions**
- C) the concentrations of the reactants and products
- D) the potential energies of the reactants and products

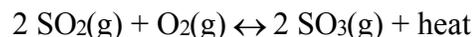
22. A chemical reaction is at equilibrium. Compared to the rate of the forward reaction, the rate of the reverse reaction is

- A) faster and more reactant is produced
- B) faster and more product is produced
- C) the same and the reaction has stopped
- D) the same and the reaction continues in both directions**

23. When $\text{AgNO}_3(\text{aq})$ is mixed with $\text{NaCl}(\text{aq})$, a reaction occurs which tends to go to completion and not reach equilibrium because

- A) a gas is formed
- B) water is formed
- C) a weak acid is formed
- D) a precipitate is formed**

24. Given the reaction at equilibrium:



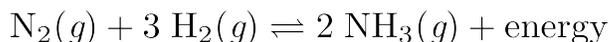
Which change will shift the equilibrium to the right?

- A) increasing the temperature
- B) increasing the pressure**
- C) decreasing the amount of $\text{SO}_2(\text{g})$
- D) decreasing the amount of $\text{O}_2(\text{g})$

25. The addition of a catalyst to a system at equilibrium will increase the rate of

- A) the forward reaction, only
- B) the reverse reaction, only
- C) both the forward and reverse reactions**
- D) neither the forward nor reverse reaction

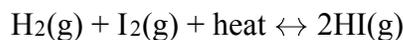
26. Given the equation representing a reaction at equilibrium:



Which change causes the equilibrium to shift to the right?

- A) decreasing the concentration of $\text{H}_2(\text{g})$
- B) decreasing the pressure
- C) increasing the concentration of $\text{N}_2(\text{g})$**
- D) increasing the temperature

27. Given the equation representing a reaction at equilibrium:



Which change favors the reverse reaction?

- A) decreasing the concentration of $\text{HI}(\text{g})$
- B) decreasing the temperature**
- C) increasing the concentration of $\text{I}_2(\text{g})$
- D) increasing the pressure

28. 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**

Do Now Unit 9 Kinetics & equilibrium

29. A reaction will be spontaneous if it results in products that have

- A) lower potential energy and less randomness
- B) lower potential energy and more randomness**
- C) greater potential energy and less randomness
- D) greater potential energy and more randomness

30. As the temperature increases, the rate of the exothermic reaction in an equilibrium reaction

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

Answer Key

Do Now Unit 9 Kinetics and Equilibrium

1. **B**
 2. **C**
 3. **A**
 4. **C**
 5. **B**
 6. **D**
 7. **D**
 8. **D**
 9. **B**
 10. **B**
 11. **A**
 12. **A**
 13. **B**
 14. **D**
 15. **A**
 16. **D**
 17. **C**
 18. **D**
 19. **C**
 20. **B**
 21. **B**
 22. **D**
 23. **D**
 24. **B**
 25. **C**
 26. **C**
 27. **B**
 28. **D**
 29. **B**
 30. **A**
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