Chem 167 Quiz 3 Answer Key PDF PDF

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Which of the following are types of chemical reactions?

- [ ] Synthesis
- [ ] Decomposition
- [ ] Single Replacement
- [ ] Combust ion

Which factors can affect the rate of a chemical reaction?

- [ ] Temperature
- [ ] Catalyst presence
- [ ] Concentration of reactants
- [ ] Surface area of reactants

Which of the following statements about acids and bases are true?

- [ ] Acids donate protons according to Brønst ed-Lowry theory.
- [ ] Bases accept electrons according to Lewis theory.
- [ ] Strong acids completely dissociate in water.
- [ ] Bases increase the concentration of OH- ions in solution.

Which properties are periodic trends in the periodic table?

- [ ] Electronegativity
- [ ] Atomic radius
- [ ] Ionization energy
- [ ] Electron affinity

Which of the following are characteristics of exothermic reactions?

- [ ] Release of heat
- [ ] Negative ΔH

- [ ] Products have lower energy than reactants
- [ ] Absorption of heat

What is the correct balanced equation for the combustion of methane (CH_4)?

- ◯ $CH_4 + O_2 \rightarrow CO_2 + H_2O$
- ◯ $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
- ◯ $CH_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$
- ◯ $CH_4 + 2O_2 \rightarrow 2CO_2 + H_2O$

Which of the following is a strong acid?

- ◯ Acetic acid
- ◯ Hydrochloric acid
- ◯ Ammonia
- ◯ Sodium hydroxide

What is the molecular geometry of water (H_2O) according to VSEPR theory?

- ◯ Linear
- ◯ Trigonal planar
- ◯ Bent
- ◯ Tet rahedral

Which element has the highest electronegativity?

- ◯ Oxygen
- ◯ Fluorine
- ◯ Chlorine
- ◯ Nitrogen

What is the main product of the reaction between an acid and a base?

- ◯ Salt and water
- ◯ Carbon dioxide and water
- ◯ Hydrogen gas
- ◯ Oxygen gas

Explain how Le Chatelier's principle can be used to predict the effect of changing conditions on a chemical equilibrium. Provide an example to illustrate your explanation.

Describe the process of calculating the enthalpy change (ΔH) for a reaction using Hess's Law. Include a step-by-step approach with a hypothetical reaction.

Discuss the differences between ionic and covalent bonds. Include examples of each and explain how these differences affect the properties of the compounds formed.

Analyze the impact of temperature on the solubility of gases in liquids. How does this relate to real-world phenomena such as carbonated beverages?

Evaluate the role of catalysts in chemical reactions. How do they affect the activation energy and the rate of reaction? Provide examples of industrial applications.

Which of the following are examples of intermolecular forces?

- [ ] Hydrogen bonding
- [ ] Ionic bonding
- [ ] Dipole-dipole interactions
- [ ] London dispersion forces

Which of the following are characteristics of a dynamic equilibrium?

- [ ] The forward and reverse reactions occur at the same rate.
- [ ] The concentrations of reactants and products remain constant.
- [ ] The system is static and unchanging.
- [ ] The equilibrium can be shifted by changing conditions.

Which statements about the pH scale are correct?

- [ ] A pH of 7 is neutral.
- [ ] A pH less than 7 is acidic.
- [ ] A pH greater than 7 is basic.
- [ ] A pH of 0 is the strongest base.

What is the primary reason for the increase in atomic size down a group in the periodic table?

- ◯ Increase in nuclear charge
- ◯ Addition of electron shells
- ◯ Increase in electronegativity
- ◯ Decrease in ionization energy

Which of the following elements is a noble gas?

- ◯ Oxygen
- ◯ Nitrogen
- ◯ Argon
- ◯ Chlorine

What is the main characteristic of a covalent bond?

- ◯ Transfer of electrons
- ◯ Sharing of electrons
- ◯ Formation of ions
- ◯ Attraction between oppositely charged ions

Discuss the significance of stoichiometry in chemical reactions. How does it help in predicting the amounts of reactants and products involved?

Explain the concept of activation energy and its importance in chemical kinetics. How can it be altered in a reaction?

Describe the process of determining the empirical formula of a compound from its percent composition. Provide a detailed example.

Analyze the environmental impact of combustion reactions. What are some strategies to mitigate their negative effects?

Evaluate the use of the periodic table as a tool for predicting chemical behavior. How do periodic trends assist in this prediction?