Catalysts Quiz Answer Key PDF

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Which processes commonly use catalysts? (Select all that apply)

A. Ammonia synthesis ✓

B. Fermentation

C. C cracking in oil refineries ✓

D. Water freezing

How do catalysts contribute to economic savings in industrial production?

Catalysts contribute to economic savings in industrial production by increasing reaction rates, allowing for lower energy usage and reduced material costs.

Which factor does NOT affect catalytic activity?

A. Temperature

B. Pressure

C. Color of the catalyst ✓

D. Concentration of reactants

What is a common cause of catalyst deactivation?

A. Increasing temperature

B. Catalyst poisoning ✓

C. Increasing pressure

D. Adding more reactants

What is the role of a catalyst in the Haber process?

A. To produce more nitrogen

B. To increase the yield of ammonia ✓

C. To separate hydrogen and nitrogen
D. To cool down the reaction

Discuss the environmental benefits of using catalysts in industrial processes.

The environmental benefits of using catalysts in industrial processes include increased reaction efficiency, reduced energy requirements, and minimized byproduct formation, which collectively contribute to a more sustainable and eco-friendly manufacturing approach.

What are enzymes, and how do they function as biological catalysts? Provide an example.

Enzymes are proteins that act as biological catalysts, facilitating and accelerating chemical reactions in the body by lowering the activation energy. For example, amylase catalyzes the breakdown of starch into sugars.

Describe the difference between homogeneous and heterogeneous catalysts with examples.

Homogeneous catalysts are substances that exist in the same phase as the reactants, such as sulfuric acid in a liquid reaction, while heterogeneous catalysts exist in a different phase, like solid platinum used in gas-phase reactions.

Which of the following are types of catalysts? (Select all that apply)

A. Homogeneous ✓
B. Heterogeneous ✓
C. Enzymes ✓
D. Ionic

Identify and explain a common challenge associated with catalyst deactivation.

Fouling is a common challenge associated with catalyst deactivation.

What is the primary function of a catalyst in a chemical reaction?

A. To increase the temperature
B. To decrease the activation energy ✓
C. To increase the concentration of reactants

D. To change the reaction products

Which type of catalyst operates in the same phase as the reactants?

A. Heterogeneous catalyst
B. Enzyme
C. Homogeneous catalyst ✓
D. Biological catalyst

Explain how a catalyst lowers the activation energy of a chemical reaction.

A catalyst lowers the activation energy of a chemical reaction by providing an alternative reaction pathway that requires less energy for the reactants to convert into products.

What are the benefits of using catalysts in industrial processes? (Select all that apply)

A. Reduced energy consumption ✓
B. Increased reaction time
C. Lower greenhouse gas emissions ✓
D. Higher production costs

What happens to a catalyst at the end of a reaction?

A. It is consumed
B. It is regenerated ✓
C. It becomes a product
D. It decomposes

In which industry are catalysts crucial for reducing emissions?

A. Textile
B. Automotive ✓
C. Food processing
D. Agriculture

Which of the following is a biological catalyst?

A. Metal oxide
B. Enzyme ✓
C. Acid
D. Base

What are characteristics of an effective catalyst? (Select all that apply)

A. High selectivity ✓
B. Low activation energy ✓
C. High reactivity with products
D. Stability under reaction conditions ✓

Which factors can affect the activity of a catalyst? (Select all that apply)

A. Temperature ✓
B. Catalyst concentration ✓
C. Presence of inhibitors ✓
D. Color of the catalyst

Which of the following can lead to catalyst deactivation? (Select all that apply)

A. Sinter ✓
B. Coking ✓
C. Increasing temperature
D. Catalyst poisoning ✓