

Galvanic Cells Quiz Answer Key PDF

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In a galvanic cell, where does oxidation occur?

- A. Cathode
- B. Anode ✓**
- C. Salt bridge
- D. Electrolyte

What is measured in volts in a galvanic cell?

- A. Current
- B. Resistance
- C. Cell potential ✓**
- D. Charge

What is the standard electrode potential used for?

- A. To measure current
- B. To calculate cell potential ✓**
- C. To determine temperature
- D. To store energy

What is the role of the cathode in a galvanic cell?

- A. Site of oxidation
- B. Site of reduction ✓**
- C. Maintains electrical neutrality
- D. Provides a pathway for electron flow

Describe a real-world application of galvanic cells and explain how they function within that application.

A real-world application of galvanic cells is in batteries, such as those used in smartphones and electric vehicles. In these batteries, a galvanic cell consists of two electrodes (anode and cathode) immersed in an electrolyte, where oxidation occurs at the anode and reduction at the cathode, generating a flow of electrons that provides electrical power.

Which applications utilize galvanic cells?

- A. Electroplating ✓
- B. Corrosion prevention ✓
- C. Heating systems
- D. Battery technology ✓
- E. Water purification

Describe the role of the salt bridge in a galvanic cell and why it is essential for the cell's operation.

The salt bridge serves to connect the two half-cells of a galvanic cell, allowing ions to flow between them, which maintains charge balance and enables the continuous flow of electrons through the external circuit.

What are the differences between primary and secondary galvanic cells? Provide examples of each.

Primary galvanic cells, such as alkaline batteries, are non-rechargeable and provide energy until the reactants are exhausted. In contrast, secondary galvanic cells, like lithium-ion batteries, are rechargeable and can be used multiple times.

Discuss the importance of standard electrode potentials in determining the cell potential of a galvanic cell.

Standard electrode potentials allow us to calculate the cell potential (E°_{cell}) of a galvanic cell using the formula $E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$, where the potentials are derived from standard reduction potentials.

How does the flow of electrons differ from the flow of ions in a galvanic cell?

Electrons flow through the external circuit from anode to cathode, while ions flow through the electrolyte, with cations moving to the cathode and anions to the anode.

Which component of a galvanic cell maintains electrical neutrality?

- A. Electrodes
- B. Electrolyte
- C. Salt bridge ✓**
- D. External circuit

What is the primary function of a galvanic cell?

- A. Convert electrical energy into chemical energy
- B. Convert chemical energy into electrical energy ✓**
- C. Store thermal energy
- D. Measure temperature

Explain how a galvanic cell converts chemical energy into electrical energy.

A galvanic cell converts chemical energy into electrical energy by facilitating a spontaneous redox reaction, where electrons are transferred from the oxidized substance at the anode to the reduced substance at the cathode, creating an electric current.

Which metal is commonly used as an electrode in galvanic cells?

- A. Iron
- B. Gold
- C. Copper ✓**
- D. Mercury

Which of the following statements about the salt bridge are true?

- A. It conducts electrons
- B. It prevents charge buildup ✓**
- C. It allows ion flow ✓**
- D. It is an insulator
- E. It maintains electrical neutrality ✓**

Which of the following is a primary cell?

- A. Lead-acid battery
- B. Nickel-cadmium battery
- C. Alkaline battery ✓**

D. Lithium-ion battery

Which processes occur in a galvanic cell?

- A. Oxidation ✓**
- B. Reduction ✓**
- C. Combustions
- D. Neutralization
- E. Electron flow ✓**

Which of the following are components of a galvanic cell?

- A. Anode ✓**
- B. Cathode ✓**
- C. Electrolyte ✓**
- D. Transformer
- E. Salt bridge ✓**

In a galvanic cell, what roles do the electrodes play?

- A. Anode releases electrons ✓**
- B. Cathode releases electrons
- C. Anode gains electrons
- D. Cathode gains electrons ✓**
- E. Both electrodes are neutral

What are the characteristics of secondary cells?

- A. Rechargeable ✓**
- B. Single-use
- C. Used in smartphones ✓**
- D. Non-rechargeable
- E. Used in remote controls