

## Electrochemical Cells Quiz Answer Key PDF

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**What factors can affect the performance of an electrochemical cell? (Select all that apply)**

- A. Temperature ✓
- B. Concentration of electrolytes ✓
- C. Pressure ✓
- D. Color of electrodes

**Which of the following are components of a galvanic cell? (Select all that apply)**

- A. Anode ✓
- B. Cathode ✓
- C. External power source
- D. Salt bridge ✓

**Which of the following is a characteristic of an electrolytic cell?**

- A. It generates electrical energy spontaneously.
- B. It requires an external power source. ✓
- C. It uses a salt bridge.
- D. It has a positive anode.

**What is the primary function of a galvanic cell?**

- A. To convert electrical energy into chemical energy
- B. To convert chemical energy into electrical energy ✓
- C. To store electrical energy
- D. To measure electrical resistance

**Which of the following are applications of electrochemical cells? (Select all that apply)**

- A. Battery ✓
- B. Electroplating ✓
- C. Corrosion prevention ✓
- D. Photosynthesis

**Describe the process of writing a cell notation for a simple galvanic cell.**

The cell notation for a simple galvanic cell is written as: anode | anode solution || cathode solution | cathode, where the anode is the site of oxidation and the cathode is the site of reduction.

**Explain how corrosion is related to electrochemical cells and how it can be prevented.**

Corrosion occurs when metals react with environmental elements, leading to oxidation, which is akin to the reactions in electrochemical cells. It can be prevented through methods such as applying protective coatings, using corrosion-resistant alloys, and implementing cathodic protection.

**In an electrochemical cell, where does oxidation occur?**

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

**Describe the function of a salt bridge in an electrochemical cell.**

The function of a salt bridge in an electrochemical cell is to connect the two half-cells and allow the movement of ions, which helps to maintain charge balance and complete the circuit.

**Which of the following best describes a primary battery?**

- A. Rechargeable
- B. Non-rechargeable ✓
- C. Used in solar panels
- D. Used in fuel cells

**Which component of an electrochemical cell maintains electrical neutrality?**

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

**What is the standard electrode potential of the standard hydrogen electrode (SHE)?**

- A. 1.0 V
- B. 0.5 V
- C. 0 V ✓**
- D. -1.0 V

**What is the role of the electrolyte in an electrochemical cell?**

- A. To conduct electrons
- B. To conduct ions ✓**
- C. To prevent oxidation
- D. To provide a surface for reaction

**Discuss the environmental impact of battery disposal and recycling.**

**Battery disposal poses serious environmental risks as they contain hazardous substances like lead, cadmium, and lithium, which can contaminate soil and water. Recycling batteries helps to recover these materials, reduces pollution, and lessens the demand for raw materials, making it a crucial practice for environmental protection.**

**What does the Nernst equation calculate?**

- A. Standard electrode potential
- B. Cell potential under non-standard conditions ✓**
- C. Gibbs free energy
- D. Rate of reaction

**Explain the difference between a galvanic cell and an electrolytic cell.**

**The main difference between a galvanic cell and an electrolytic cell is that a galvanic cell converts chemical energy into electrical energy through spontaneous reactions, whereas an electrolytic cell**

requires an external power source to drive non-spontaneous reactions, converting electrical energy into chemical energy.

Which of the following are true for a cathode in a galvanic cell? (Select all that apply)

- A. It is the site of reduction. ✓
- B. It is the site of oxidation.
- C. It is positively charged.
- D. It is negatively charged. ✓

What are the characteristics of a secondary battery? (Select all that apply)

- A. Rechargeable ✓
- B. Non-rechargeable
- C. Used in portable electronics ✓
- D. Used in single-use applications

Which reactions occur in an electrochemical cell? (Select all that apply)

- A. Oxidation ✓
- B. Reduction ✓
- C. Neutralization
- D. Precipitation

How does the Nernst equation relate to cell potential and concentration?

The Nernst equation states that the cell potential (E) is directly related to the logarithm of the ratio of the concentrations of the products and reactants, expressed as  $E = E^\circ - (RT/nF)\ln(Q)$ , where  $E^\circ$  is the standard cell potential, R is the gas constant, T is the temperature in Kelvin, n is the number of moles of electrons transferred, F is Faraday's constant, and Q is the reaction quotient.