B13 · Extra practice

Original diploma-style practice | Items 1-2

Extra practice for this lesson. Original questions, not released diploma items. Select one option for multiple choice; other tasks state the required response.

Use the givens and conditions in each prompt. Enter the requested count, coefficient, oxidation number or potential with the stated unit and precision.

B13-D01 · Numerical response

A lead-acid cell uses PbO_2 (+1.69 V) as the cathode and $PbSO_4$/Pb (−0.36 V) as the anode. What is E°cell, in volts to two decimal places?

Response: _____

B13-D02 · Numerical response

A battery is made of lead-acid cells of 2.05 V each, joined in a row. How many cells give 12.3 V? Enter an integer.

Response: _____

B13 · Extra practice

Original diploma-style practice | Items 3-4

B13-D03 · Numerical response

A hydrogen fuel cell uses $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$ (+1.23 V) and $2H^+ + 2e^- \rightarrow H_2$ (0.00 V). What is E°cell, in volts to two decimal places?

Response: _____

B13-D04 · Multiple choice

A battery is recharged. What kind of cell is it during recharging?

A. A voltaic cell
B. An electrolytic cell
C. A fuel cell
D. Neither

Response: _____

B13 · Extra practice

Original diploma-style practice | Items 5-6

B13-D05 · Select all that apply

Select every correct statement about a discharging lead-acid battery.

A. Pb is oxidized at the anode
B. Solid $PbSO_4$ forms on both electrodes
C. The acid becomes more concentrated
D. Each electrode gains mass

Response: _____

B13-D06 · Multiple choice

What is the difference between a fuel cell and a battery?

A. A fuel cell is fed its reactants, but a battery stores a fixed amount
B. A fuel cell is an electrolytic cell
C. A battery needs no electrolyte
D. A fuel cell stores all of its fuel inside

Response: _____

B13 · Extra practice

Original diploma-style practice | Items 7-8

B13-D07 · Multiple choice

In $Zn + 2OH^- \rightarrow ZnO + H_2O + 2e^-$ in an alkaline cell, which electrode is zinc?

A. The anode, because zinc is oxidized
B. The cathode, because zinc is oxidized
C. The anode, because zinc is reduced
D. The cathode, because zinc is reduced

Response: _____

B13-D08 · Numerical response

How many moles of electrons are transferred for each mole of Zn in $Zn + 2OH^- \rightarrow ZnO + H_2O + 2e^-$? Enter an integer.

Response: _____

B13 · Extra practice

Original diploma-style practice | Items 9-10

B13-D09 · Multiple choice

Copper oxide is heated with charcoal: $2CuO + C \rightarrow 2Cu + CO_2$. Which statement is correct?

A. Carbon is the reducing agent
B. Carbon is the oxidizing agent
C. Copper is oxidized
D. Nothing changes oxidation number

Response: _____

B13-D10 · Matching

Match each item to its description.

Items to match:

1. Primary cell
2. Secondary cell
3. Fuel cell
4. Salt-water pool system

Targets:

A. Rechargeable
B. Used once
C. Fed fuel all the time
D. Makes chlorine by electrolysis

Response: _____

B13 · Extra practice

Original diploma-style practice | Items 11-12

B13-D11 · Multiple choice

In $Cl_2 + 2OH^- \rightarrow Cl^- + OCl^- + H_2O$, what are the oxidation numbers of chlorine in Cl_2, Cl^- and OCl^-?

A. 0, −1 and +1
B. 0, +1 and −1
C. −1, 0 and +1
D. 0, −1 and −1

Response: _____

B13-D12 · Written response

A company says that a battery is the best choice because it has the highest voltage. Explain what other evidence is needed to judge it for a purpose.

Response: _____