B3 · 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.

B3-D01 · Numerical response

In $Al \rightarrow Al^{3+} + ne^{-}$, what is n? Enter a whole number.

Response: _____

B3-D02 · Numerical response

A reduction half-reaction takes two electrons. An oxidation half-reaction gives three. What is the lowest number of electrons both can move before you add them? Enter a whole number.

Response: _____

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Original diploma-style practice | Items 3-4

B3-D03 · Numerical response

In acidic solution, balance MnO_4^- → Mn^{2+}. After you balance O with water, how many H^+ are needed? Enter a whole number.

Response: _____

B3-D04 · Multiple choice

For $MnO_4^- + 8H^+ \rightarrow Mn^{2+} + 4H_2O$, how many electrons must be added, and on which side?

A. Seven on the left
B. Five on the right
C. Two on the right
D. Five on the left

Response: _____

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Original diploma-style practice | Items 5-6

B3-D05 · Select all that apply

Select every correct step when you balance in acidic solution.

A. Use H_2O to balance oxygen
B. Use H^+ to balance hydrogen
C. Change the formula of a product to fix oxygen
D. Make the electrons equal before you add the halves

Response: _____

B3-D06 · Ordering / ranking

Put the steps in order for balancing a half-reaction in acid. The reactant and the product are already written.

First to last

1. Balance the charge with electrons
2. Balance oxygen with H_2O
3. Check the atoms and the charge
4. Balance elements other than O and H
5. Balance hydrogen with H^+

Response: _____

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Original diploma-style practice | Items 7-8

B3-D07 · Matching

Match each failed check to the mistake it shows.

Items to match:

1. $Zn \rightarrow Zn^{2+} + e^{-}$ has one Zn on each side, but the charge is 0 and +1
2. $Al + Cu^{2+} \rightarrow Al^{3+} + Cu$ has a charge of +2 and +3
3. $MnO_4^{-} \rightarrow Mn^{2+}$ has no oxygen in the products

Targets:

A. Oxygen count missing
B. Electron coefficient wrong in a half
C. Unequal electron exchange in a net equation

Response: _____

B3-D08 · Numerical response

In acidic solution, balance $Cr_2O_7^{2-} \rightarrow 2Cr^{3+}$. How many electrons are in the balanced half-reaction? Enter a whole number.

Response: _____

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Original diploma-style practice | Items 9-10

B3-D09 · Multiple choice

A student multiplies $Fe^{2+} \rightarrow Fe^{3+} + e^-$ by five, but writes $Fe^{2+} \rightarrow Fe^{3+} + 5e^-$. Which choice is correct?

A. $5Fe^{2+} \rightarrow 5Fe^{3+} + 5e^-$

B. $Fe^{10+} \rightarrow Fe^{15+} + 5e^-$

C. $Fe^{2+} + 5e^- \rightarrow Fe^{3+}$

D. The original is already correct

Response: _____

B3-D10 · Multiple choice

Check this half-reaction in basic solution: $OCl^- + H_2O + 2e^- \rightarrow Cl^- + 2OH^-$. What is the total charge on each side?

A. 0

B. -1

C. -2

D. -3

Response: _____

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Original diploma-style practice | Items 11-12

B3-D11 · Written response

Join the half-reactions $H_2O_2 \rightarrow O_2 + 2H^+ + 2e^-$ and $H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$. Write the net equation and explain everything you cancelled.

Response: _____

B3-D12 · Select all that apply

Select every correct final check for a whole redox equation.

A. Each element has the same number of atoms on both sides
B. The total charge is the same on both sides
C. No electrons are left after the halves are added
D. Both sides must add to zero

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 13-14

B3-D13 · Numerical response

In acidic solution, two halves were added and the electrons were cancelled. The result is $2MnO_4^- + 16H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2 + 10H^+$. H^+ is on both sides. After you cancel it, how many H^+ are left on the left side? Enter a whole number.

Response: _____

B3-D14 · Numerical response

$Cu^+(aq)$ reacts with itself. Given two half-reactions: $Cu^+ \rightarrow Cu^{2+} + e^-$ and $Cu^+ + e^- \rightarrow Cu$. Add them and cancel the electrons. What is the coefficient of Cu^+ in the equation with the lowest whole numbers? Enter a whole number.

Response: _____