**Balancing Redox Reactions: Half-Reaction Method Practice Worksheet**

# Multiple Choice Questions

For each question, four alternative choices are given, of which only one is correct. You have to select the correct alternative and mark it in the appropriate option.

1. Given the equation below:

Fe (*s*) + CuSO4 (*aq*) → Cu (*s*) + FeSO4 (*aq*)

What is the balanced half reaction of Fe?

* 1. Fe → Fe3+ + 3e−
  2. Fe3+ → Fe + 3e−
  3. Fe2+ + 2e−→ Fe
  4. Fe → Fe2+ + 2e−

1. Given the unbalanced equation below:

6HCl (*aq*) + 2Al (*s*) → 3H2 (*g*) + 2AlCl3 (*aq*)

What is the balanced half reaction of Al?

* 1. Al3+ + 3e−→ Al
  2. Al3+ + 2e−→ Al
  3. Al → Al3+ + 2e−
  4. Al → Al3+ + 3e−

1. When dilute nitric acid is poured on a piece of copper metal, copper (II) ions and the gas nitric oxide, NO, are formed. What are the coefficients of Cu, NO3−, H+, Cu2+, NO, and H2O in the balanced net ionic equation respectively?
   1. 3, 2, 8, 3, 2, 4
   2. 2, 2, 8, 3, 2, 4
   3. 1, 2, 4, 4, 3, 2
   4. 2, 3, 4, 7, 1, 5
   5. 3, 3, 8 3, 2, 4
2. Given the unbalanced equation below:

Cr2O3(*s*) + Al(*s*) → Cr(*s*) + Al2O3(*s*)

What is the balanced half reaction of Al?

* 1. Al3++ 3e−→ Al
  2. Al → Al3++ 3e−
  3. Al → Al3++ 2e−
  4. Al3++ 2e−→ Al

1. Given the following redox reaction:

KBr + Cl2 → KCl + Br2

What are the coefficients of Br−, Cl2, Cl−, and Br2 in the balanced net ionic equation respectively?

a. 2, 2, 1, 1

* 1. 2, 1, 2, 1
  2. 1, 2, 1, 2
  3. 1, 2, 2, 1

1. Given the following unbalanced redox reaction:

*MnO4- + Cl-* → *Mn*2+ + *Cl*2 (acidic solution)

Which is the completely balanced oxidation half-reaction?

* 1. *e*−+4*H*++*MnO**Mn*2++4*H*2*O*
  2. 5*e*−+8*H*++*MnO**Mn*2++4*H*2*O*
  3. 2*Cl*−→*Cl*2+2*e*−
  4. 2*Cl*−+2*e*−→*Cl*2

1. When dilute hydrochloric acid is poured on a piece of magnesium metal, magnesium (II) ions and the gas hydrogen are formed. What are the coefficients of Mg, H+, Mg2+, and H2 in the balanced net ionic equation respectively?
   1. 2, 1, 2, 2
   2. 1, 2, 1, 1
   3. 2, 1, 2, 1
   4. 1, 2, 1, 2
   5. 1, 1, 1, 1
2. In a certain half-reaction, the total charge on the reactant side of the equation is +3. The total charge on the product side of the equation is −2. How should electrons be added to this half-reaction?
   1. 1 electron should be added to the product side.
   2. 5 electrons should be added to the product side.
   3. 5 electrons should be added to the reactant side.
   4. 1 electron should be added to the reactant side.

# Fill in the Blanks Questions

Fill in the answer blanks with correct answer.

1. The unbalanced ionic equation needs to the \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ reactions need to be balanced separately before being added back together. Answer:

# True False Questions

Indicate True or False for the following Statements.

1. When balancing hydrogens in an acidic medium, add hydrogen ions to the side of the equation which needs them. ( True/False )

# Answer Keys

1. Fe → Fe2+ + 2e−
2. Al → Al3+ + 3e−
3. 3, 2, 8, 3, 2, 4
4. Al → Al3++ 3e−
5. 2, 1, 2, 1
6. 2*Cl*−→*Cl*2+2*e*−
7. 1, 2, 1, 1
8. 5 electrons should be added to the reactant side.
9. reduction (or) oxidation , oxidation (or) reduction
10. TRUE