Reduction & Oxidation

1. In the reaction 2Fe2+(aq) + Br2(l) 🡪 2Fe3+(aq) + 2Br-(aq) , the chemical Fe2+(aq) has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons and has undergone \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

|  |  |  |
| --- | --- | --- |
| a | Gained | Reduction |
| b | Gained | Oxidation |
| c | Lost | Reduction |
| d | Lost | oxidation |

1. The products in the spontaneous reaction between Sn2+(aq)and Cu2+(aq) will be \_\_\_\_\_\_ and \_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| a | Cu(s) | Sn(s) |
| b | Cu(s) | Sn4+(aq) |
| c | Cu2+(aq) | Sn(s) |
| d | Cu2+(aq) | Sn2+(aq) |

1. The reducing agent capable of converting 1.0 Sn4+(aq) ions to Sn2+(aq) but not capable of converting 1.0  Sn2+(aq) to Sn(s) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | Pb(s) |
| b | Ni(s) |
| c | Cu(s) |
| d | Cr(s) |

1. If fluorine gas is bubbled through Nal(aq), then \_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
| a | Na+(aq) | Reduced |
| b | I-(aq) | Oxidized |
| c | F2(g) | Oxidized |
| d | I-(aq) | Reduced |

1. The **balanced net ionic equation** for the reaction that occurs when

a piece of potassium is dropped into a container of water is \_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | 2K(s) + 2H2O(l) 🡪 H2(g) + 2K+(aq) + 2OH-(aq) |
| b | K(s) + 2H2O(l) 🡪 H2(g) + K+(aq) + 2OH-(aq) |
| c | K(s) + 2H2O(l) 🡪 H+(aq) + K+(aq) + OH-(aq) |
| d | 2K(s) + 2H2O(l) 🡪 H+(aq) + 2K+(aq) + 2OH-(aq) |

1. When Fe(s) is placed in a solution containing Cu(NO3)2(aq) and MgCl2(aq) the most likely balanced redox reaction is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | 3Cu2+(aq) + 2Fe(s) 🡪 2Fe3+(aq) + 3Cu(s) |
| b | Cu2+(aq) + Fe(s) 🡪 Fe2+(aq) + Cu(s) |
| c | Cu(s) + 2Fe3+(aq) 🡪 2Fe2+(aq) + Cu2+(aq) |
| d | Mg2+(aq) + 2Cl-(aq) 🡪 Mg(s) + Cl2(g) |

1. A student gathers information to determine the reactivity of fluorine gas. If the information is accurate, then a **correct statement** is that \_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | Li(s) gains electrons more easily than does F2(g) |
| b | F2(g) loses electrons more easily than does Li(s) |
| c | F2(g) loses electrons more easily than does Cl2(g) |
| d | F2(g) gains electrons more easily than does Cl2(g) |

1. The species that is reduced in the reaction given below is \_\_\_\_\_\_\_.

Cr2O72-(aq) + 14H+(aq) + 3Sn2+(aq) 🡪 3Sn4+(aq) + 2Cr3+(aq) + 7H2O(l)

|  |  |
| --- | --- |
| a | Cr2O72-(aq) |
| b | Cr3+(aq) |
| c | Sn2+(aq) |
| d | Sn4+(aq) |

1. A solution of acidified potassium permanganate is stored in an iron container. The net ionic equation for a reaction that occurs is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | MnO4-(aq) + 8H+(aq) + 5K(s) 🡪 Mn2+(aq) + 2H2O(l) + 5K+(aq) |
| b | 2MnO4-(aq) + 16H+(aq) + 5Fe(s) 🡪 2Mn2+(aq) + 8H2O(l) + 5Fe2+(aq) |
| c | MnO4-(aq) + 8H+(aq) + Fe2+(aq) 🡪 Mn2+(aq) + 4H2O(l) + Fe3+(aq) |
| d | MnO4-(aq) + 8H+(aq) + Fe(s) 🡪 Mn2+(aq) + 4H2O(l) + Fe2+(aq) |

1. The unbalanced equation that represents a reduction half-reaction is \_\_\_\_\_\_

|  |  |
| --- | --- |
| a | X2+(aq) 🡪 X3+(aq) |
| b | R2+(aq) 🡪 R+(aq) |
| c | Z(s) 🡪 Z3+(aq) |
| d | 2M-(aq) 🡪 M2(g) |

1. The balanced net ionic equation for the most probable spontaneous reaction of iron (II) chloride with acidified potassium nitrate is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| a | 2Fe2+(aq) + 4H+(aq) +2 NO3-(aq) 🡪 2Fe3+(aq) + N2O4(g) + 2H2O(l) |
| b | 2Fe2+(aq) + 8H+(aq) +4NO3-(aq) 🡪 2Fe(s) + 2N2O4(g) + 4H2O(l) |
| c | Fe2+(aq) + 2H2O(l) 🡪 Fe(s) + 4H+(aq) + O2(g) |
| d | Fe2+(aq) + 2Cl-(aq) 🡪 Fe(s) + Cl2(g) |

1. **Numerical response question:** Left justify your answer in the boxes provided.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Consider the four equations listed below   |  |  | | --- | --- | | 1 | C3H8(g) + 5O2(g) 🡪 3CO2(g) + 4H2O(g) | | 2 | 3Ni(NO3)2(aq) + 2Al(s) 🡪 2Al(NO3)3(aq) + 3Ni(s) | | 3 | NaCl(s) + HNO3(aq) 🡪 HCl(aq) + NaNO3(aq) | | 4 | 4HCN(g) + 9O2(g) 🡪 4CO2(g) + 2H2O(g) + 4NO2(g)­ |   Choose **all** the reactions above that are oxidation-reduction reactions. List the answer(s) in **ascending order**. |
| Solutions:   1. D 2. B 3. A 4. B 5. A 6. B 7. D 8. A 9. B 10. B 11. A 12. 124 |