**5.9 HONORS CLASS WORKSHEET – REDOX REACTIONS II (OXIDIZING AND REDUCING AGENTS)**

1. Explain the meaning of the following terms:

|  |  |
| --- | --- |
| OXIDIZING AGENT |  |
| REDUCING AGENT |  |

1. For the following reduction half-equations, identify the atom being reduced and state the change in oxidation number

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Reduction Half-Equation | Atom Being Reduced | Initial oxidation number | Final oxidation number |
| A | Cu2+ + 2e- 🡪 Cu | Cu | +2 | 0 |
| b | 2H+ + 2e- 🡪 H2 |  |  |  |
| c | Cl2 + 2e- 🡪 2Cl- |  |  |  |
| d | Fe3+ + e- 🡪 Fe2+ |  |  |  |
| e | O2 + 4H+ + 4e- 🡪 2H2O |  |  |  |
| f | H2SO4 + 2H+ + 2e- 🡪 SO2 + 2H2O |  |  |  |
| g | HNO3 + 3H+ + 3e- 🡪 NO + 2H2O |  |  |  |

1. For the following oxidation half-equations, identify the atom being oxidized and state the change in oxidation number

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Oxidation Half-Equation | Atom Being Oxidized | Initial oxidation number | Final oxidation number |
| a | Zn 🡪 Zn2+ + 2e- | Zn | 0 | +2 |
| b | 2Br- 🡪 Br2 + 2e- |  |  |  |
| c | Sn2+ 🡪 Sn4+ + 2e- |  |  |  |
| d | H2O2 🡪 2H+ + O2 + 2e- |  |  |  |
| e | SO32- + H2O 🡪 2H+ + SO42- + 2e- |  |  |  |
| f | H2 🡪 2H+ + 2e- |  |  |  |

1. Combine the following pairs of half-equations from questions 2 and 3 to make redox reactions:

|  |  |  |
| --- | --- | --- |
| (i) | 2b and 3a | |
|  | Answer: | 2H+ + 2e- 🡪 H2  Zn 🡪 Zn2+ + 2e-  Zn + 2H+ 🡪 Zn2+ + H2 |
| (ii) | 2d and 3c | |
|  | Answer: |  |
| (iii) | 2f and 3b | |
|  | Answer: |  |
| (iv) | 2g and 3e | |
|  | Answer: |  |
| (v) | 2e and 3f | |
|  | Answer: |  |

1. For each reaction in Q4, identify the oxidizing agent and the reducing agent:

|  |  |  |
| --- | --- | --- |
| Reaction | Oxidizing Agent | Reducing Agent |
| 4 (i) |  |  |
| 4 (ii) |  |  |
| 4 (iii) |  |  |
| 4 (iv) |  |  |
| 4 (v) |  |  |