1. Which of the following chemical reactions will produce a precipitate?
   1. 3KBr + AlPO4 → K3PO4 + AlBr3
   2. ZnCl2 + Mg2SO4 → ZnSO4 + MgCl2
   3. Na2CO3 + CaCl2 → CaCO3 + 2NaCl
   4. NH4OH + KCl → KOH + NH4Cl

**C.10.H Readiness**

Zn(s) + 2H+(aq) → Zn2+(aq) + H2(g)

1. Which of the following statements **best** explains why this chemical reaction is an oxidation reduction reaction?
2. Zn reacts under basic conditions.
3. Zn dissolves in an aqueous solution.
4. Zn and H+ undergo a change of state.
5. Zn loses electrons and H+ gains electrons.

**C.10.H Readiness**

1. The reaction below shows carbon monoxide burning in oxygen.

2 CO + O2 → 2 CO2

What is the change in the oxidation number of carbon for this reaction?

* 1. +2 to +1
  2. +2 to +4
  3. +4 to +1
  4. +4 to +2

**C.10.H Readiness**

1. Copper (II) nitrate and sodium hydroxide solutions react in a test tube as shown below.

Cu(NO3)2(aq) + 2NaOH(aq)→ Cu(OH)2(s) + 2NaNO3(aq)

If nitric acid is added to the test tube, the amount of solid precipitate decreases. The **best**explanation for this is that the acid

1. dilutes the solution making the precipitate dissolve.
2. reacts with the copper (II) nitrate, pulling the equilibrium to the left.
3. will dissolve most solids, including sodium nitrate.
4. will react with the copper (II) hydroxide to form water and soluble copper (II) nitrate.

**C.10.H Readiness/C.2.E - Process**

1. Consider this balanced chemical equation:

Zn (*s*) + 2 HCl (*aq*) → ZnCl2 (*aq*) + H2 (*g*)

Which is the oxidation half-reaction?

* 1. Zn → Zn2+ + 2e-
  2. Zn + 2e- → Zn2+
  3. 2H+ → H2 + 2e-
  4. 2H+ + 2e- → H2

**C.10.H Readiness**

1. Which of the following reaction shows an acid-base reaction?

1. Na2CO3 + CaCl2 → CaCO3 + 2NaCl
2. HCl + NaOH → H2O +NaCl
3. CH4 + O2 → CO2 + H2O
4. Mg +HCl → MgCl2 + H2

**C.10.H Readiness**

1. Under certain conditions, solid magnesium (Mg) and solid sulfur (S) can combine and form magnesium sulfide (MgS). The oxidation-reduction reaction is shown below

Mg (s) + S (s) → MgS (g)

Which of the following is the oxidation number for Mg in MgS in this reaction?

1. +1
2. -1
3. +2
4. -2

**C.10.H Readiness/C.2.E - Process**

1. What are the usual products when a strong acid and a strong base react?
2. water and a metal oxide
3. water and a salt
4. water and a base
5. water and carbon dioxide

**C.10.H Readiness**

1. Which of the following is always a product of an acid-base reaction?
   1. Acid
   2. Oxygen
   3. Sodium chloride
   4. Water

**C.10.H Readiness**

1. Which term correctly describes the type of reaction shown below?

CaCl(*aq*) + NaCO(*aq*)  CaCO(*s*) + 2NaCl(*aq*)

1. Acid – Base
2. Precipitation
3. Oxidation – Reduction
4. Synthesis

**C.10.H Readiness**

1. Which reactant or reactants are oxidized in the reaction shown below?

Cu(*s*) + 2AgNO(*aq*)  Cu(NO)(*aq*) + 2Ag(*s*)

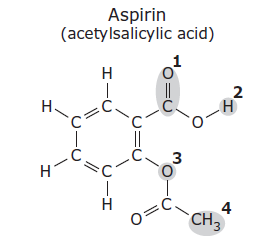
|  |  |
| --- | --- |
|  | 1. Cu is oxidized because it receives electrons from Ag. 2. Cu is oxidized because it loses electrons during the reaction. 3. Both reactants are oxidized because Cu and Ag exchange electrons. 4. Neither reactant is oxidized because no electrons are transferred. |

**C.10.H Readiness**

1. Which of the following is one of the products of the reaction between sulfuric acid and sodium hydroxide?
2. Hydrogen
3. Sodium hydride
4. Sodium sulfate
5. Sulfur dioxide

**C.10.H Readiness**

1. The diagram below shows the structure of a common pain reliever.



Which of the highlighted atoms or group of atoms makes aspirin a Brønsted-Lowry acid?

* 1. 1
  2. 2
  3. 3
  4. 4

**C.10.G Supporting/C.2.I - Process**

1. In any sample of water, there are some ions because of the self-ionization reaction:

2H2O  H3O+ + OH-

What is a Bronsted-Lowry base in this reversible reaction?

1. H2O only
2. H3O +  only
3. H2O and OH-
4. There are no Bronsted-Lowry acids or bases in this reaction.

**C.10.G Supporting/C.2.I - Process**

1. In the reaction represented by this equation, which substance(s) act as a Bronsted-Lowry acid?

CH3COOH + H2O  H3O+ + CH3COO-

1. CH3COOH only
2. H2O only
3. CH3COOH and H3O+
4. H2O and CH3COO-

**C.10.G Supporting**

1. What is the [H+] of an HCl solution if the pH is measured to be 6?
2. 1 x 10 -7 *M*
3. 1 x 10 -6 *M*
4. 6 x 10 -6 *M*
5. 8 x 10 -1 *M*

**C.10.I Supporting/C.2.G - Process**

1. Grapefruit juice has a pOH of approximately 11.0. What is the pH of grapefruit juice?
2. 3.0
3. 5.0
4. 9.0
5. 11.0

**C.10.I Supporting**

1. What is the pH of a substance with 6.0 × 10–8*M* [H3O+]?
   1. 7.22
   2. 4.90
   3. 1.89
2. 2.63

**C.10.I Supporting/C.2.G - Process**

1. An acid solution has a pH value of 5. Which of these statements correctly describes the acid?
   1. It is a strong acid.
   2. It is a weak acid.
   3. It is a dilute acid.
   4. There is not enough information to determine strength or concentration.

**C.10.J Supporting**

1. Hydrochloric acid is a strong acid. How will it dissociate in water?
   1. It will not dissociate in water.
   2. It will partially dissociate in water.
   3. It will fully dissociate in water.
2. It will not mix with water.

**C.10.J Supporting**

Unit 9 Concepts of Acids and Bases Common Assessment Answer Key

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item Number** | **Correct Answer** | **Readiness or Supporting** | **Content Student Expectation** | **Process Student Expectation** |
| 1 | C | R | C.10.H |  |
| 2 | J | R | C.10.H |  |
| 3 | B | R | C.10.H |  |
| 4 | J | R | C.10.H | C.2.E |
| 5 | A | R | C.10.H |  |
| 6 | G | R | C.10.H |  |
| 7 | C | R | C.10.H | C.2.E |
| 8 | G | R | C.10.H |  |
| 9 | D | R | C.10.H |  |
| 10 | G | R | C.10.H |  |
| 11 | B | R | C.10.H |  |
| 12 | H | R | C.10.H |  |
| 13 | B | S | C.10.G | C.2.I |
| 14 | H | S | C.10.G | C.2.I |
| 15 | C | S | C.10.G |  |
| 16 | G | S | C.10.I | C.2.G |
| 17 | A | S | C.10.I |  |
| 18 | F | S | C.10.I | C.2.G |
| 19 | D | S | C.10.J |  |
| 20 | H | S | C.10.J |  |