**Ch. 6 and 7: Physical and Chemical Changes, Equation Balancing, and Solubility Answer Key**

1. Which statement is true about physical and chemical changes?
   1. Physical changes alter a substance’s elemental composition.
   2. Phase changes are the only type of physical change.
   3. Chemical changes only alter the look of a substance.
   4. **Chemical changes create new substances.**
   5. None of the statements are true.
2. Which scenario is a chemical change?
   1. A solid melts when heated.
   2. **Two colorless solutions are mixed, and the resulting solution is pink.**
   3. Sucrose and sodium chloride are mixed.
   4. Water is heated, and a gas is seen on the container’s lid.
   5. Solid CO2 becomes a gas at room temperature.
3. Which picture(s) represent(s) a chemical change?

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1. i only
2. **ii only**
3. iii only
4. i and iii
5. i and iii
6. What is true about a balanced chemical equation?
   1. The number of molecules on each side of the equation is the same.
   2. The number of substances on each side of the equation is the same.
   3. **The number of atoms on each side of the equation is the same.**
   4. a and c
   5. a, b, and c
7. What is the coefficient for NO2 when the equation is balanced?

**NO2**(g) + H2O(l) 🡪 HNO3(aq) + NO(g)

* 1. 1
  2. 2
  3. **3**
  4. 4
  5. 5

1. What are the correct coefficients when the equation is balanced?

\_\_\_ PCl3(l) + ­\_\_\_ H2O(l) 🡪 \_\_\_ H3PO3(aq) + \_\_\_ HCl(aq)

1. **1,3 🡪 1,3**
2. 1,2 🡪 1,1
3. 1,3 🡪 2,1
4. 3,6 🡪 1,9
5. What are the correct coefficients when the equation is balanced?

\_\_\_ Cr2O3(s) + \_\_\_ CCl4(l) 🡪 \_\_\_ CrCl3(s) + \_\_\_ COCl2(g)

* 1. 1,2 🡪 2,3
  2. 1,2 🡪 2,2
  3. 2,3 🡪 2,3
  4. **1,3 🡪 2,3**

1. What is the coefficient for O2 when the equation for the combustion of ethane is balanced?

C2H6(g) + **O2**(g) 🡪 CO2(g) + H2O(g)

* 1. 4
  2. 7
  3. 8
  4. 10
  5. **14**

1. What is an aqueous solution?
   1. Any homogeneous mixture.
   2. Any heterogeneous mixture.
   3. Any homogeneous mixture with a liquid solvent.
   4. **Any homogeneous mixture with water as the solvent.**
   5. Any homogeneous mixture containing an ionic compound.
2. What substances are in solution when a sample of BaCl2 is dissolved in water?
   1. Ba(aq) and Cl(aq)
   2. **Ba2+(aq) and Cl-(aq)**
   3. Ba2+(aq) and Cl2(aq)
   4. BaCl2(s)
   5. Ba(s) and Cl2(g)
3. Which statement is true about the solubility rules?
   1. There are no soluble compounds that contain sulfide.
   2. Every chloride-containing compound is soluble.
   3. Some ions are insoluble.
   4. **Every sodium-containing compound is soluble.**
   5. All the statements are true.
4. Which ionic compound is insoluble?
   1. RbCl
   2. MgSO4
   3. (NH4)2CO3
   4. K3PO4
   5. **They are all soluble in water.**
5. Which picture shows the products of the reaction between CaCl2(aq) and AgNO3(aq)? **a**

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1. A solution contains a mixture of Na+, Ba2+, and Ag+. First, sodium chloride is added to the solution, and a white precipitate is formed. After filtering, what would need to be added to separate the remaining ions?
   1. **Add sulfate to separate sodium and barium.**
   2. Add sulfate to separate barium and silver.
   3. Add hydroxide to separate sodium and silver.
   4. Add hydroxide to separate sodium and barium.
   5. Add hydroxide to separate silver and barium.

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| Solubility Rules |
| 1. All nitrate and acetate salts are soluble. 2. All Group 1 and ammonium (NH4+) salts are soluble. 3. Most Group 17 salts are soluble. Notable exceptions are Group 17 salts containing Ag+, Pb2+, and Hg22+. 4. Most sulfate salts are soluble. Notable exceptions are BaSO4, PbSO4, and CaSO4. 5. Most hydroxide compounds are insoluble. Notable exceptions are NaOH, KOH, Ba(OH)2, and Ca(OH)2. 6. Most sulfide (S2-), carbonate (CO32-), and phosphate (PO43-) salts are insoluble. |