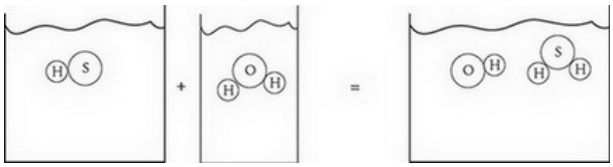
AP Chemistry Practice Test 7

Real AP Past Papers with Multiple-Choice Questions

1. The average mass, in grams, of one mole of carbon atoms is equal to

- A. the average mass of a single carbon atom, measured in amus.
- B. the ratio of the number of carbon atoms to the mass of a single carbon atom.
- C. the number of carbon atoms in one amu of carbon.
- D. the mass, in grams, of the most abundant isotope of carbon.

2.



The diagram above best represents which type of reaction?

- A. Acid/base
- B. Oxidation/reduction
- C. Precipitation
- D. Decomposition

3. Which of the following is true for all bases?

- A. All bases donate OH^- ions into solution.
- B. Only strong bases create solutions in which OH^- ions are present.
- C. Only strong bases are good conductors when dissolved in solution.
- D. For weak bases, the concentration of the OH^- ions exceeds the concentration of the base in the solution.

Questions 4-6 refer to the following information.

$14H^+(aq) + Cr_2O_7^{2-}(aq) + 3Ni(s) \rightarrow$

$2Cr^{3+}(aq) + 3Ni^{2+}(aq) + 7H_2O(l)$

In the above reaction, a piece of solid nickel is added to a solution of potassium dichromate.

4. Which species is being oxidized and which is being reduced?

Oxidized Reduced

- A. $Cr_2O_7^{2-}(aq)$ $Ni(s)$
- B. $Cr^{3+}(aq)$ $Ni^{2+}(aq)$
- C. $Ni(s)$ $Cr_2O_7^{2-}(aq)$
- D. $Ni^{2+}(aq)$ $Cr^{3+}(aq)$

5. How many moles of electrons are transferred when 1 mole of potassium dichromate is mixed with 3 mol of nickel?

- A. 2 moles of electrons

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○ B. 3 moles of electrons

○ C. 5 moles of electrons

○ D. 6 moles of electrons

6. How does the pH of the solution change as the reaction progresses?

○ A. It increases until the solution becomes basic.

○ B. It increases, but the solution remains acidic.

○ C. It decreases until the solution becomes basic.

○ D. It decreases, but the solution remains acidic.

7. A sample of an unknown chloride compound was dissolved in water, and then titrated with excess $Pb(NO_3)_2$ to create a precipitate. After drying, it is determined there are 0.0050 mol of precipitate present. What mass of chloride is present in the original sample?

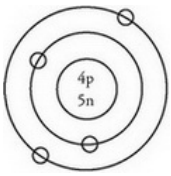
○ A. 0.177 g

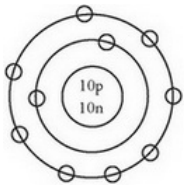
○ B. 0.355 g

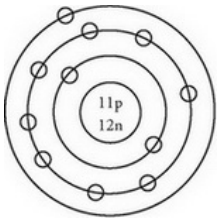
○ C. 0.522 g

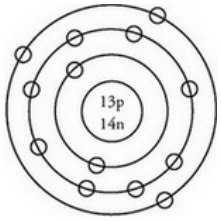
○ D. 0.710 g

8. A photoelectron spectra for which of the following atoms would show peaks at exactly three different binding energies?

○ A. 

○ B. 

○ C. 

○ D. 

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9. The bond length between any two nonmetal atoms is achieved under which of the following conditions?

○ A. Where the energy of interaction between the atoms is at its minimum value

○ B. Where the nuclei of each atom exhibits the strongest attraction to the electrons of the other atom

○ C. The point at which the attractive and repulsive forces between the two atoms are equal

○ D. The closest point at which a valence electron from one atom can transfer to the other atom

10. Hydrogen fluoride, HF, is a liquid at 15°C. All other hydrogen halides (represented by HX, where X is any other halogen) are gases at the same temperature. Why?

○ A. Fluorine has a very high electronegativity; therefore the H-F bond is stronger than any other H-X bond.

○ B. HF is smaller than any other H-X molecule; therefore it exhibits stronger London dispersion forces.

○ C. The dipoles in a HF molecule exhibit a particularly strong attraction force to the dipoles in other HF molecules.

○ D. The H-F bond is the most ionic in character compared to all other hydrogen halides.

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	Initial pH	pH after NaOH addition
Acid 1	3.0	3.5
Acid 2	3.0	5.0

Two different acids with identical pH are placed in separate beakers. Identical portions of NaOH are added to each beaker, and the resulting pH is indicated in the table above. What can be determined about the strength of each acid?

- A. Acid 1 is a strong acid and acid 2 is a weak acid because acid 1 resists change in pH more effectively.
- B. Acid 1 is a strong acid and acid 2 is a weak acid because the NaOH is more effective at neutralizing acid 2.
- C. Acid 1 is a weak acid and acid 2 is a strong acid because the concentration of the weak acid must be significantly greater to have the same pH as the strong acid.
- D. Acid 1 is a weak acid and acid 2 is a strong acid because the concentration of the hydrogen ions will be greater in acid 2 after the NaOH addition.

12. A stock solution of 12.0 *M* sulfuric acid is made available. What is the best procedure to make up 100. mL of 4.0 *M* sulfuric acid using the stock solution and water prior to mixing?

- A. Add 33.3 mL of water to the flask, and then add 66.7 mL of 12.0 *M* acid.
- B. Add 33.3 mL of 12.0 *M* acid to the flask, and then dilute it with 66.7 mL of water.
- C. Add 67.7 mL of 12.0 *M* acid to the flask, and then dilute it with 33.3 mL of water.
- D. Add 67.7 mL of water to the flask, and then add 33.3 mL of 12.0 *M* acid.

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