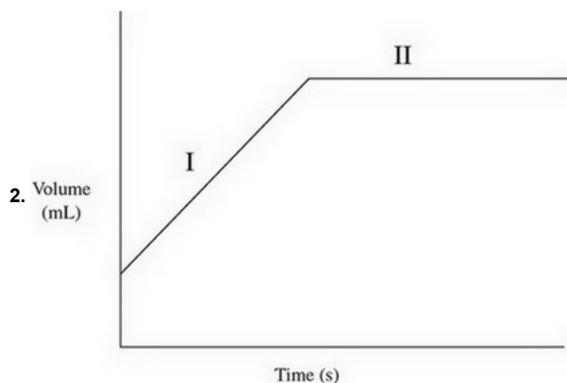**AP Chemistry Practice Test 6**

Real AP Past Papers with Multiple-Choice Questions

1. A compound is made up of entirely silicon and oxygen atoms. If there are 14.00 g of silicon and 32.0 g of oxygen present, what is the empirical formula of the compound?

○ A. SiO_2

○ B. SiO_4

○ C. Si_2O

○ D. Si_2O_3

2.

The volume of a gas is charted over time, giving the above results. Which of the following options provides a possibel explinatin of what was happening to the gas during each phase of the graph?

○ A. During phase I, the temperature decreased while the pressure increased. During phase II, the temperature was held constant as the pressure decreased.

○ B. During phase I, the temperature increased while the pressure was held constant. During phase II, the temperature and pressure both decreased.

○ C. During phase I, the temperature was held constant while the pressure increased. During phase II, the temperature and pressure both decreased.

○ D. During phase I, the temperature and pressure both increased. During phase II, the temperature was held constant while the pressure decreased.

3. A solution of sulfurous acid, H_2SO_3, is present in an aqueous solution. Which of the following represents the concentrations of three different ions in solution?

○ A. $[SO_3^{2-}] > [HSO_3^-] > [H_2SO_3]$

○ B. $[H_2SO_3] > [HSO_3^-] > [SO_3^{2-}]$

○ C. $[H_2SO_3] > [HSO_3^-] = [SO_3^{2-}]$

○ D. $[SO_3^{2-}] = [HSO_3^-] > [H_2SO_3]$

4. $2NO(g) + Br_2(g) \leftrightarrow 2NOBr(g)$
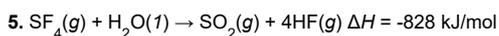
The above experiment was performed several times, and the following data was gathered:

Trial	$[NO]_{init}$ (M)	$[Br_2]_{init}$ (M)	Initial Rate of Reaction (M/min)
1	0.20 M	0.10 M	5.20×10^{-3}
2	0.20 M	0.20 M	1.04×10^{-2}
3	0.40 M	0.10 M	2.08×10^{-2}

What is the rate law for this reaction?

○ A. rate = $k[NO][Br_2]^2$

○ B. rate = $k[NO]^2[Br_2]^2$

○ C. rate = $k[NO][Br_2]$

○ D. rate = $k[NO]^2[Br_2]$

5. $SF_4(g) + H_2O(1) \rightarrow SO_2(g) + 4HF(g) \ \Delta H = $ -828 kJ/mol

Which of the following statements accurately describes the above reaction?

○ A. The entropy of the reactants exceeds that of the products.

○ B. $H_2O(l)$ will always be the limiting reagent.

○ C. This reaction is never thermodynamically favored.
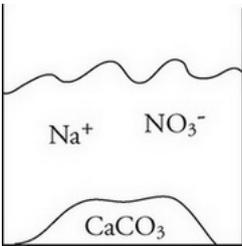
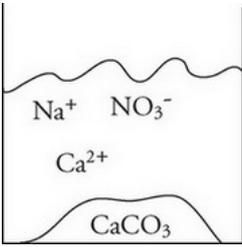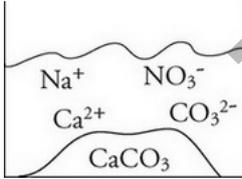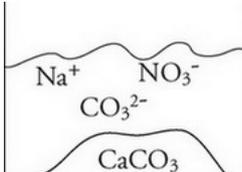○ D. The bond strength of the reactants exceeds that of the products.

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Questions 6-9 refer to the following information.

20.0 mL of 1.0 M Na CO₃ is placed in a beaker and titrated with a solution of 1.0 M Ca(NO₃)₂, resulting in the creation of a
precipitate. The conductivity of the solution is measured as the titration progresses.
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6. How much $Ca(NO_3)_2$ must be added to reach the equivalence point?

○ A. 10.0 mL

○ B. 20.0 mL

○ C. 30.0 mL

○ D. 40.0 mL

7. Which of the following diagrams correctly shows the species present in the solution in significant amounts at the equivalence point?

A. Na^+ NO_3^- / $CaCO_3$

B. Na^+ NO_3^- / Ca^{2+} / $CaCO_3$

C. Na^+ NO_3^- / Ca^{2+} CO_3^{2-} / $CaCO_3$

D. Na^+ NO_3^- / CO_3^{2-} / $CaCO_3$

8. What will happen to the conductivity of the solution after additional $Ca(NO_3)_2$ is added past the equivalence point?

○ A. The conductivity will increase as additional ions are being added to the solution.

○ B. The conductivity will stay constant as the precipitation reaction has gone to completion.

○ C. The conductivity will decrease as the solution will be diluted with the addition of additional $Ca(NO_3)_2$.

○ D. The conductivity will stay constant as equilibrium has been established.

9. If the experiment were repeated and the Na_2CO_3 was diluted to 40.0 mL with distilled water prior to the titration, how would that affect the volume of $Ca(NO_3)_2$ needed to reach the equivalence point?

○ A. It would be cut in half.

○ B. It would decrease by a factor of 1.5.

○ C. It would double.

○ D. It would not change.

10. $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

2.0 mol of $CO(g)$ and 2.0 mol of $O_2(g)$ are pumped into a rigid, evacuated 4.0-L container, where they react to form $CO_2(g)$. Which of the following values does NOT represent a potential set of concentrations for each gas at a given point during the reaction?

	CO	O_2	CO_2
○ A.	0.5	0.5	0
○ B.	0	0.25	0.5
○ C.	0.25	0.25	0.5
○ D.	0.25	0.38	0.25

11. Neutral atoms of chlorine are bombarded by high-energy photons, causing the ejection of electrons from the various filled subshells. Electrons originally from which subshell would have the highest velocity after being ejected?

○ A. 1s

○ B. 2p

○ C. 3p

○ D. 3d

12. A sample of oxygen gas at 50 °C is heated, reaching a final temperature of 100 °C. Which statement best describes the behavior of the gas molecules?

○ A. Their velocity increases by a factor of two.

○ B. Their velocity increases by a factor of four.

○ C. Their kinetic energy increases by a factor of 2.

○ D. Their kinetic energy increases by a factor of less than 2.