Topics 4.5 – 4.6: MCQ Practice

$$CS_2(g) + 3\ Cl_2(g) \rightarrow CCl_4(g) + S_2Cl_2(g)$$

1. In a certain experiment, a 48.0 g sample of $CS_2(g)$ reacts completely with $Cl_2(g)$ in a chemical reaction according to the equation shown above. What is the minimum mass of $Cl_2(g)$ consumed in this experiment?

   (A) 44.7 g $Cl_2(g)$

   (B) 134 g $Cl_2(g)$

   (C) 144 g $Cl_2(g)$

   (D) 213 g $Cl_2(g)$

2. Which of the following will produce the greatest mass of $CO_2(g)$ when it undergoes complete combustion with $O_2(g)$?

   (A) 100 g of CH_4

   (B) 200 g of C_2H_6

   (C) 300 g of C_3H_8

   (D) 400 g of $C_4H_{10}O_2$

$$2\ C_6H_{14}(g) + 19\ O_2(g) \rightarrow 12\ CO_2(g) + 14\ H_2O(g)$$

3. Hexane, $C_6H_{14}(g)$, undergoes combustion with $O_2(g)$ according to the equation above. In a certain experiment, 12 mol of $C_6H_{14}(g)$ reacts with 95 mol of $O_2(g)$ until one of the reactants is completely consumed. Which of the following statements is correct?

   (A) C_6H_{14} is the limiting reactant and 70. mol of H_2O is formed.

   (B) C_6H_{14} is the limiting reactant and 84 mol of H_2O is formed.

   (C) O_2 is the limiting reactant and 70. mol of H_2O is formed.

   (D) O_2 is the limiting reactant and 84 mol of H_2O is formed.

$$2\ KClO_3(s) \rightarrow 2\ KCl(s) + 3\ O_2(g)$$

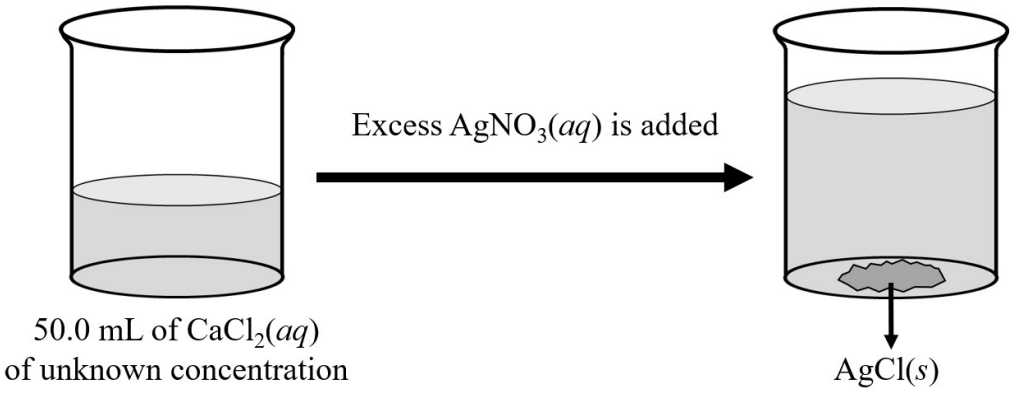
4. When 6.00 g of $KClO_3(s)$ undergoes decomposition according to the equation above, 2.00 g of $O_2(g)$ is produced. What is the percent yield of $O_2(g)$ in this experiment?

   (A) 33.3%

   (B) 42.6%

   (C) 78.5%

   (D) 85.1%



$$CaCl_2(aq) + 2\ AgNO_3(aq) \rightarrow Ca(NO_3)_2(aq) + 2\ AgCl(s)$$

5. A student adds an excess amount of $AgNO_3(aq)$ to a 50.0 mL sample of $CaCl_2(aq)$ of unknown concentration. A precipitate of $AgCl(s)$ is formed according to the equation above. If 5.73 g of $AgCl(s)$ is formed in this experiment, what is the approximate concentration of $CaCl_2$ in the original unknown solution?

   (A) 0.0200 *M*

   (B) 0.400 *M*

   (C) 0.800 *M*

   (D) 1.60 *M*

$$6\ H^+(aq)\ +\ 2\ MnO_4^-(aq)\ +\ 5\ H_2C_2O_4(aq)\ \rightarrow\ 10\ CO_2(g)\ +\ 8\ H_2O(l)\ +\ 2\ Mn^{2+}(aq)$$

6. A student dissolved a sample of oxalic acid, $H_2C_2O_4$, in water in an Erlenmeyer flask. Then the student titrated the $H_2C_2O_4$ solution in the flask with a solution of $KMnO_4(aq)$ in a buret. The chemical equation for the reaction that occurred during the titration is shown above. The volume of 0.0250 *M* $KMnO_4(aq)$ required to reach the end point of the titration was 19.20 mL. How many moles of $H_2C_2O_4$ were present in the flask?

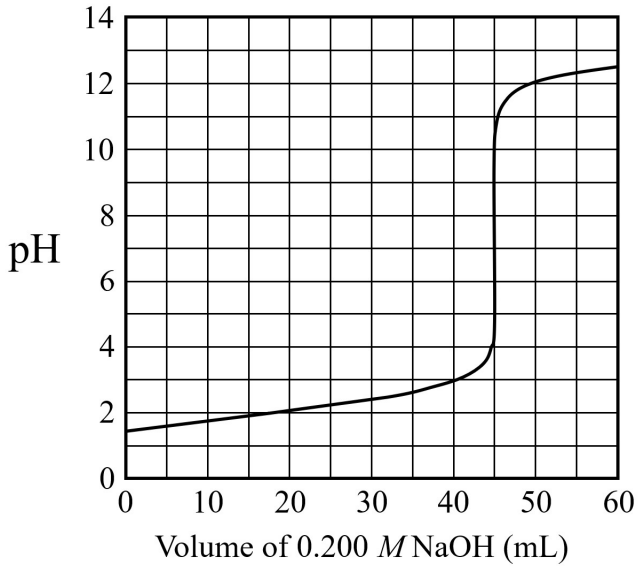
   (A) 1.92×10^{-4} mol $H_2C_2O_4$

   (B) 4.80×10^{-4} mol $H_2C_2O_4$

   (C) 1.20×10^{-3} mol $H_2C_2O_4$

   (D) 1.20 mol $H_2C_2O_4$

7. A 50.0 mL sample of an acid, HA, of unknown molarity is titrated with NaOH. The pH of the resulting solution is measured with a pH meter and graphed as a function of the volume of 0.200 *M* NaOH added. The titration curve is shown below.



   A student carries out the same titration but uses an indicator instead of a pH meter. If the indicator changes color slightly past the equivalence point, what will the student obtain for the calculated concentration of the acid?

   (A) Slightly less than 0.180 *M*

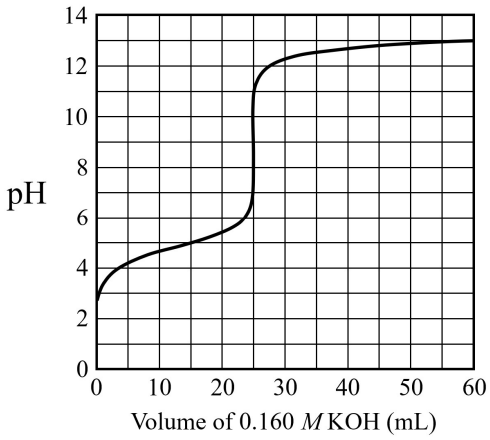
   (B) Slightly more than 0.180 *M*

   (C) Slightly less than 0.222 *M*

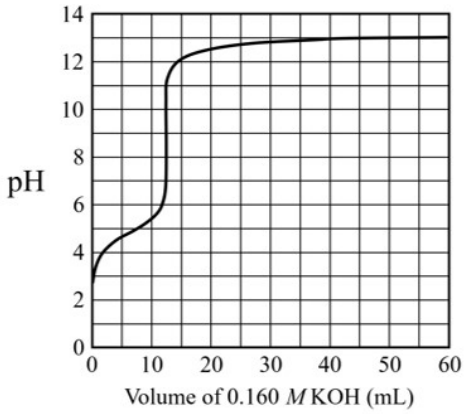
   (D) Slightly more than 0.222 *M*

$$HC_2H_3O_2(aq) + KOH(aq) \rightarrow KC_2H_3O_2(aq) + H_2O(l)$$

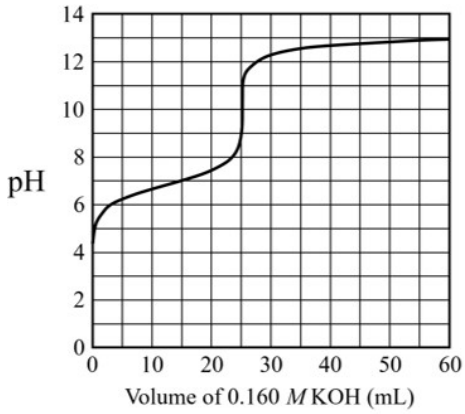
8. The reaction between acetic acid, $HC_2H_3O_2$, and potassium hydroxide, KOH, is represented by the equation shown above. A student titrates 20.0 mL of 0.200 *M* $HC_2H_3O_2(aq)$ with 0.160 *M* KOH(*aq*), using a probe to monitor the pH of the solution. The data are plotted, producing the following titration curve.



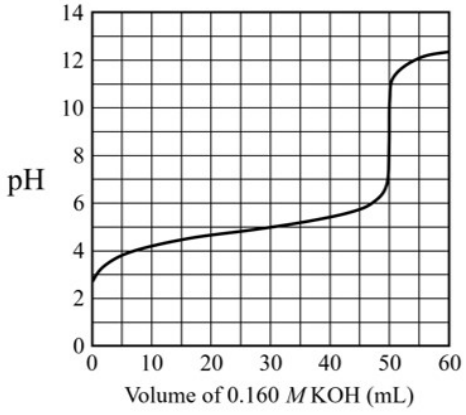
A second student titrates 20.0 mL of 0.100 *M* $HC_2H_3O_2(aq)$ with 0.160 *M* KOH(*aq*). Which of the following diagrams is most likely to represent the titration curve from the second student's titration?



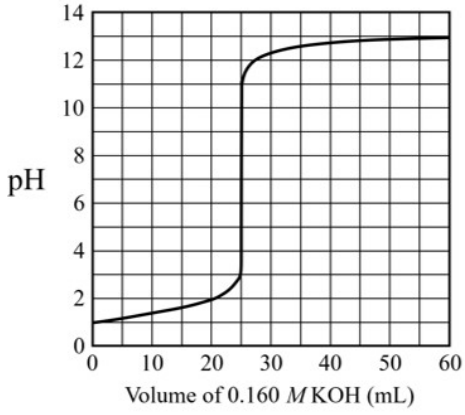
(A)



(C)



(B)



(D)

$$HX(aq) + NaOH(aq) \rightarrow NaX(aq) + H_2O(l)$$

9. A chemist performed a titration experiment in order to determine the molar mass of an acidic substance, HX. The chemist dissolved a 1.40 g sample of HX(*s*) in water and added a few drops of an acid-base indicator to the solution to ensure visual detection of the end point. The chemist titrated the HX(*aq*) solution with NaOH(*aq*). The chemical equation for the reaction that occurred during the titration is shown above. The volume of 0.500 *M* NaOH(*aq*) required to reach the end point of the titration was 22.95 mL. What is the approximate value for the molar mass of HX?

   (A) 30.5 g/mol

   (B) 61.0 g/mol

   (C) 122 g/mol

   (D) 244 g/mol