Ms. Pall's Solution Chemistry MEGA Review Problem III

1. a. Calculate the concentration of a 2.85 g osmium (VI) phosphate dissolved in 175.0 mL of distilled water? (4.28×10^{-2} M)

b. Calculate the concentration of the ions in the osmium (VI) phosphate solution?
$[Os^{+6}] = 4.28 \times 10^{-2}$ M $[PO_4^{3-}] = 8.56 \times 10^{-2}$ M

c. Calculate the number of ions present in the 2.85 g osmium (VI) phosphate?
(1.35×10^{-22})

d. 20.00 mL of the prepared osmium (VI) phosphate solution is diluted to make a new 250.0 mL solution
i. Determine the concentration of the diluted solution?
[3.43×10^{-3} M]

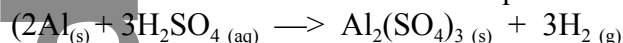 ii. Determine the concentration of the ions in the diluted solution?
$[Os^{+6}]$ = 3.43×10^{-3} M
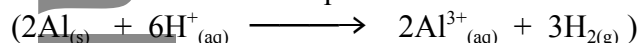$[PO_4^{3-}]$ = $3.43 \times 10^{-3} \times 2 = 6.85 \times 10^{-3}$ M

2. a. 5.00 g of aluminum metal is reacted with 25.00 mL of 0.200 mol L^{-1} of sulphuric acid.

i. Determine the balanced chemical equation including the states.
($2Al_{(s)} + 3H_2SO_{4 \ (aq)} \longrightarrow Al_2(SO_4)_{3 \ (s)} + 3H_{2 \ (g)}$

ii. Write the total dissociated ionic equation.

iii. Write the net ionic equation:
($2Al_{(s)} + 6H^+_{(aq)} \longrightarrow 2Al^{3+}_{(aq)} + 3H_{2(g)}$)

b. Determine the mass of the aluminium sulphate that would be theoretically obtained.

c. Calculate the pH of the 0.200 mol L^{-1} of sulphuric acid.

d. i. What volume of 1.50 mol L^{-1} sodium hydroxide wold be required for the complete neutralization of 25.00 mL of 0.200 mol L^{-1} of sulphuric acid.

ii. What is the pH of the final solution?

iii. Name a suitable indicator for the neutralization reaction of sodium hydroxide and with sulphuric acid.

iv. Write a net ionic equation for the reaction of sodium hydroxide with sulphuric acid.

v. Sketch a pH titration curve for the above neutralization reaction.

vi. Calculate the pH of the 1.50 mol L^{-1} sodium hydroxide