



EASTERN UNIVERSITY, SRI LANKA

THIRD EXAMINATION SECOND SEMESTER IN SCIENCE-2014/2015 (January' 2018)

CH 354 Gravimetric Analysis

Group II

Answer all questions

Time Allowed: Three hour

You are provided with the following solutions.

1. An aqueous solution **X** contains 6.0 g impure $(\text{NH}_4)_2\text{SO}_4$ in one liter.
2. An aqueous solution **Y** contains 45 g of BaCl_2 in one liter.

Pipette out the given solution **X** (25.0 ml) into a 400 ml beaker. Add 0.5 ml of Con.HCl with stirring. Then add 100 ml of water and heat the solution to boil. While it is in hot add the solution **Y** (10.0 ml) drop-wisely and stir the solution constantly during the addition. Keep the solution hot (not boiling) for 45 minutes on a steam bath in order to allow time for complete precipitation. Allow the solution to cool to room temperature for 10 minutes. Filter it through a **weighed** sintered glass crucible, which was dried in an oven at 120°C . Wash the precipitate with warm water until the **filtrate** gives no precipitate with a few drops of AgNO_3 solution. Dry the crucible along with the precipitate in an oven at $100\text{-}110^\circ\text{C}$ for an hour.

Carry out your experiment in duplicate

- i. Record the weight of the precipitate obtained experimentally.
- ii. Determine the concentration of SO_4^{2-} in solution **X**.
- iii. If solution **X** contains **pure** $(\text{NH}_4)_2\text{SO}_4$,
 - a. Calculate the theoretical weight of the precipitate
 - b. Calculate the weight of the unreacted BaCl_2 .
- iv. A 2.00g sample of limestone was dissolved in hydrochloric acid and all the calcium present in the sample was converted to $\text{Ca}^{2+}_{(\text{aq})}$. Excess ammonium oxalate solution, $(\text{NH}_4)_2\text{C}_2\text{O}_{4(\text{aq})}$, was added to the solution to precipitate the calcium ions as calcium oxalate $\text{CaC}_2\text{O}_{4(\text{s})}$. The precipitate was filtered, dried and weighed to a constant mass of 2.43 g. Determine the percentage by mass of calcium in the limestone sample.

(Atomic weight of S-32.0, Ca-40.0, Ba-137.0, O-16.0, C-12.0, N-14.0, H-1.0 and Cl-35.5)
