

A/R II

OXFORD LOCAL EXAMINATIONS GENERAL CERTIFICATE OF EDUCATION

Summer Examination, 1951

Advanced and Scholarship Level

CHEMISTRY, PAPER II

THURSDAY, JUNE 28. TIME ALLOWED—3 HOURS

[Write the number of the paper, R II, on the left at the head of each sheet of your answers in the space provided.]

Answer Question 1, and EITHER Question 2 OR Question 3.

The answer to Question 1 should consist of a brief statement of procedure, actual measurements, calculations, and results.

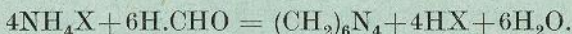
Mathematical tables are provided.]

1. (a) Solution A is decinormal oxalic acid. Standardize the sodium hydroxide solution B, which is approximately decinormal. For each titration measure 25 c.c. of solution A using a **burette** and titrate with solution B.

(b) C is an ammonium salt, NH_4X . Weigh **accurately** about 1 gm. (not more) of C, wash into a 250 c.c. flask with distilled water, and make up the solution to the mark.

Take approximately 60 c.c. of the formalin solution D, add about 3 c.c. of phenolphthalein solution (i.e. about 60 drops), then add solution B **carefully** until the solution is **just** pink.

For each titration, pipette 25 c.c. of solution C into a flask, add approximately 10 c.c. of the 'neutralized' formalin solution, mix and titrate the liberated acid with solution B. The reaction is



Calculate the percentage of ammonia (NH_3) in C.

$$(\text{N} = 14; \text{H} = 1).$$

Either,

2. Analyse the simple salts **E** and **F**, using for the latter the group tests only.

You are advised to dissolve **F** in the minimum of concentrated hydrochloric acid, and after boiling for a few minutes, to dilute about five times, then proceed with the analysis.

Or,

3. Perform the following experiments with the substance **G**, record your observations, and make inferences concerning the nature and identity of **G**. So far as possible explain your observations:

(a) Take about 0.5 gm. of **G** in a boiling-tube, add about 5 c.c. of water and roughly 1 gm. (6 pellets) of sodium hydroxide. Boil and identify the gas evolved. Continue boiling steadily for at least five minutes. Cool, neutralize the excess alkali with dilute hydrochloric acid, then add more acid and identify the gas evolved.

(b) Heat a little of **G**, in a test-tube, till liquid and continue to heat gently for about a minute. Identify the gas evolved. Allow the tube to cool, then add a few drops of water and shake to dissolve some of the residue. Next add one drop of *very dilute* copper sulphate solution, then a few drops of sodium hydroxide solution.

(c) To a solution of about 0.5 gm. of **G** in about 5 c.c. of water add ten drops of dilute hydrochloric acid, then a dilute solution of sodium nitrite. On warming, nitrogen, together with another gas (not an oxide of nitrogen) is evolved. Identify this gas.

(d) To about 5 c.c. of a concentrated solution of **G** add concentrated nitric acid.

(e) Take two test-tubes half-full of dilute nitric acid. To *one* add about 0.5 gm. of **G**. Put a piece of copper foil in both tubes and heat them in a beaker of water for some minutes.