

AN ROINN OIDEACHAIS

(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS

(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1926.

HONOURS

CHEMISTRY.

TUESDAY, 22nd JUNE.—MORNING, 10 A.M. TO 12 NOON.

Not more than *six* questions are to be attempted.
Illustrate your answers by diagrams wherever possible.

1. Describe the preparation of atmospheric nitrogen. Mention any other inactive gases found in the atmosphere. Explain the differences in properties that have been found between atmospheric nitrogen and that obtained from nitrogen compounds.

2. In what forms do bromine and iodine occur in nature? Describe the manufacture of these elements. Explain why the methods for preparing hydrogen bromide and hydrogen iodide are different from those employed for the preparation of hydrogen chloride.

3. State Dulong and Petit's Law and explain how it may assist in determining the valency of an element.

In a certain chloride the equivalent of the metal was found to be 18.7; the specific heat of the metal is 0.115. Find the atomic weight and valency of the metal.

4. When 2.04 grams of potassic chlorate (KClO_3) are heated 1.24 grams of potassic chloride are formed. When 3.9 grams of potassium are heated in chlorine gas 7.45 grms. of potassic chloride are produced. From these facts find the equivalents of potassium and chlorine (Atomic weight of oxygen = 16).

5. Why are volumetric methods of analysis used wherever possible? How may a decinormal solution of potassium permanganate be made, standardised and used for the estimation of ferrous salts?

6. Describe generally the differences in chemical structure of fats and carbohydrates. What chemical changes occur in the manufacture of soap, and in the softening of hard water by means of soap?

7. How is phosphorus manufactured? Describe its allotropic forms. How may ortho-phosphoric acid be prepared, and what changes does it undergo when heated?

8. Indicate clearly the method you would adopt in endeavouring to identify a simple salt selected from the following list of bases and acids:—

ammonium, magnesium, calcium, zinc, aluminium, iron, tin, lead, copper, silver, and nitric, sulphuric, hydrochloric and carbonic acids.

9. Explain the terms "oxidising agent" and "reducing agent." To which of these classes do the following substances belong, and why?—(a) hydrogen; (b) hydrogen sulphide; (c) manganese dioxide; (d) chlorine.

10. Mention some of the methods employed for the purification of organic compounds. Explain the processes known as "steam distillation" and "fractional distillation."