AN ROINN OIDEACHAIS
(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1938.

FULL COURSE.

CHEMISTRY.

MONDAY, 20*th JUNE*.—AFTERNOON, 4 P.M. TO 6 P.M.

(*a*) Not more than *six* questions to be answered. All questions are of equal value.

(*b*) Chemical reactions should be expressed in words and represented by chemical equations.

(*c*) Answers should be illustrated with sketches wherever possible.

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1. Explain what is meant by the equivalent of an element. How is the equivalent related to the atomic weight?

When hydrochloric acid was added to 0·3 gram of the carbonate of a metal, 72·8 cc. of carbon dioxide measured at 15° C. and 740 mm. pressure were given off. Calculate the equivalent of the metal. The specific heat of the metal was 0·149. What was its exact atomic weight?

[Volume of 1 gram molecule at S.T.P. = 22·4 litres.
Atomic weight of carbon : 12.]

2. How is vinegar manufactured? Name the acid contained in it, and give the structural formula of this acid.

3. Sketch the apparatus that you would use for making chlorine gas in the laboratory, and explain how it would work. Give equations to explain the chemical changes taking place during the process.

Compare the properties of chlorine with those of bromine and iodine.

4. State what you know about the natural occurrence or methods of preparation of *any two* of the following substances, and also describe the properties of these two substances:

(*a*) potassium chlorate,

(*b*) nitre

(*c*) bleaching powder.

5. What is an acid anhydride?

Write formulæ for the anhydrides of the following acids:

(*a*) sulphuric,

(*b*) phosphoric,

(*c*) carbonic,

(*d*) nitric.

Describe briefly the method of preparation and the properties of *any three* of these anhydrides.

6. Describe the method of preparation in the laboratory of *any one* oxide of nitrogen.

Explain how the formula of that oxide of nitrogen has been determined.

7. Name the raw material from which sodium carbonate is made, and mention a place or places in which that material occurs in quantity.

Describe a process for the manufacture of sodium carbonate.

8. Describe a process for the manufacture of hydrogen on a commercial scale. Mention any uses of hydrogen with which you are acquainted.

9. Describe (with sketch) the method by which you would determine the approximate vapour density of water.

Explain how the value of the vapour density has been used to fix the formula for water.

10. Explain what is meant by allotropy.

Give an account of the allotropic modificaitons of *any one* element. (Methods of preparation and properties.)

11. Describe the preparation of ethylene and also of methane.

How does chlorine act on each of these compounds?

Write the structural formulæ of ethylene and of methane.

12. If you were given iron, sulphur and sulphuric acid, how would you make hydrogen sulphide?

Describe *what you see* when hydrogen sulphide is passed through a solution of (*a*) lead aceate, (*b*) zinc chloride and excess of caustic soda, and (*c*) copper sulphate.