AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1951.

CHEMISTRY.—HONOURS.

WEDNESDAY, 13th JUNE.—MORNING, 10 TO 12.

Not more than *six* questions to be answered. All the questions have the same value.

Chemical changes should be expressed by equations as well as in words.

Atomic weights: C=12; Na=23; Cl=35·5.

1. Explain how Avogadro's law can be used to establish (*a*) molecular weights; (*b*) atomic weights. Illustrate your answer by reference to oxygen and carbon.

2. Describe a method for the preparation of pure carbon monoxide in the laboratory, and give an account of its properties.

How has the formula for carbon monoxide been established?

3. Describe a process for the manufacture of nitric acid.

How does nitric acid act on (*a*) tin; (*b*) iron; (*c*) ferrous sulphate; (*d*) glycerine?

4. Describe and explain the use of the following reagents in qualitative analysis:—(*a*) hydrogen sulphide; (*b*) ammonium hydroxide; (*c*) hydrochloric acid; (*d*) ammonium carbonate.

5. Explain the terms: hydrate, efflorescence, deliquescence.

A sample of washing soda which had been exposed to the air for some time weighed 12 grams. It was dissolved in distilled water and the solution was made up to 100 c.c. with distilled water.

Twenty-two c.c. of normal hydrochloric acid was required to neutralise 20 c.c. of that solution. Calculate the percentage of water in the sample after its exposure to the air.

6. Explain the method of classification of the elements according to the periodic law. Mention any chemical properties which justify the inclusion of sodium, copper and silver in the same group of elements.

7. How would you show that sulphuric acid contains sulphur and oxygen ?

How does sulphuric acid react with :—

(*a*) Copper ; (*b*) bleaching powder ; (*c*) oxalic acid ; (*d*) glucose ; (*e*) ethyl alcohol ?

8. Describe and explain what happens when an electric current is passed through aqueous solutions of :—

(*a*) hydrogen chloride ; (*b*) copper sulphate ; (*c*) sodium chloride.

Give a brief account of how the phenomenon which takes place in (*c*) is used industrially.

9. Write the structural formula for acetic acid and give an account of the evidence on which it is based.

How would you distinguish between aqueous solutions of formic acid and acetic acid ?

10. Explain what is meant by the following terms and in the case of each illustrate your answer by one example :—

(*a*) substitution compound ; (*b*) addition compound ; (*c*) double bond ; (*d*) triple bond ; (*e*) polymer ; (*f*) saponification.

11. What are the common naturally occurring compounds of calcium and aluminium ?

Describe the manufacture of cement.

12. Give an historical account of experiments on the composition of water.