

AN ROINN OIDEACHAIS

(Department of Education)

LEAVING CERTIFICATE EXAMINATION, 1961.

CHEMISTRY.—HONOURS.

SATURDAY, 17th JUNE.—MORNING, 10 TO 12.30.

Not more than *six* questions may be attempted.

Atomic weights : H=1, C=12, N=14, O=16, Na=23, P=31, S=32, Cl=35.5, K=39.

1. Describe, with the aid of a sketch of the apparatus, how you would prepare and collect pure nitrogen peroxide.

Give an account of the properties of nitrogen peroxide. Describe and explain the effect of heat on it.

[66 marks.]

2. Describe fully any *two* methods by which carbon monoxide may be prepared in the laboratory.

Give an account of the properties of carbon monoxide and describe how you would measure its volume composition.

[66 marks.]

3. Outline *four* methods for measuring the chemical equivalent of metals.

0.522 gm. of the nitrate of a certain divalent metal was dissolved in water. To this solution excess sulphuric acid was added and the precipitate which formed was washed, filtered and dried. This precipitate weighed 0.466 gm. Calculate the chemical equivalent of the metal.

[66 marks.]

4. Describe fully, with the aid of a sketch of the apparatus, how you would measure the vapour density of a liquid by Victor Meyer's method.

A compound, of vapour density 22, has the following gravimetric composition :—carbon 54.54%, hydrogen 9.09% and oxygen 36.36%. Find the empirical formula for the compound. Write, also, its structural formula, giving reasons for your answer.

[66 marks.]

5. In the case of *each of any three* of the following compounds give *two* tests for the basic radical and *one* test for the acidic radical:— (i) calcium nitrate, (ii) lead acetate, (iii) stannous chloride, (iv) zinc sulphate. Illustrate the reactions by means of chemical equations.

[66 marks.]

6. Describe an industrial method for the manufacture of sulphuric acid.

Give an account of the properties of sulphuric acid and mention its principal uses.

[66 marks.]

7. Write brief notes on each of the following:—(i) electron, (ii) proton, (iii) neutron, (iv) atomic weight, (v) atomic number, (vi) valency.

Describe the structure of (a) an atom of phosphorus, (b) an atom of sulphur, (c) an atom of chlorine. Refer briefly to the valency of these elements.

[67 marks.]

8. Give an account of the characteristic properties of aldehydes.

Name an aldehyde, write its structural formula and state the evidence on which the structural formula is based.

[67 marks.]

9. Write the structural formulae for ethane, ethylene and acetylene. Discuss the differences in the properties of these compounds.

20 c.c. of a mixture of methane and ethylene were exploded with oxygen and gave 25 c.c. of carbon dioxide. What was the composition of the mixture?

[67 marks.]

10. Describe fully how you would prepare a normal solution of (i) sodium carbonate, (ii) sulphuric acid.

7 gm. of a mixture of sodium carbonate and potassium carbonate were dissolved in water and the solution was made up to a litre. 25 c.c. of this solution were neutralized by 24 c.c. of a $1.25 \frac{N}{10}$ sulphuric acid solution. Calculate the percentage of sodium carbonate in the mixture.

[67 marks.]