

AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1958.

CHEMISTRY.—HONOURS.

TUESDAY, 17th JUNE.—AFTERNOON, 3 TO 5.30.

Not more than six questions may be attempted.

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

1. Sketch the apparatus you would use to measure the gravimetric composition of water and describe fully how you would use it.

Explain fully how the molecular formula for water is established experimentally.

[66 marks.]

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

Give an account of the properties of sulphuric acid and refer briefly to its industrial importance.

[66 marks.]

3. Outline briefly points of similarity in the chemistry of tin and lead. How may the similarity be accounted for?

Describe how you would prepare from lead samples of its chlorides. Write the formulae for these substances and give an account of their properties.

[66 marks.]

4. Describe, with the aid of a sketch of the apparatus, how you would (a) prepare and dry nitric oxide, (b) measure its volume composition.

[66 marks.]

5. What is meant by the following terms :—

(i) ion, (ii) electron, (iii) oxidation, (iv) reduction?

Write equations to illustrate the reactions which take place when

(a) chlorine is passed into a solution of sulphur dioxide,

(b) a solution of potassium permanganate is added to a solution of ferrous sulphate acidified with sulphuric acid,

(c) hydrogen sulphide is passed into a solution of ferric chloride,

(d) a mixture of phosphorus and diluted nitric acid is heated.

Using your equations show how these reactions illustrate the processes of oxidation and reduction and refer to the transfer of electrons involved in the processes in (b) and (c).

[66 marks.]

6. Write a brief note on each of the following :—

(a) chemical equivalent, (b) normal solutions, (c) indicators.

Describe fully how you would use suitable standard solutions of acid and alkali to measure the percentage of ammonia in ammonium chloride. The method of calculation must be shown clearly.

[66 marks.]

7. Describe the physical and chemical properties of acetaldehyde and give the evidence on which its structural formula is based.

Indicate by means of simple equations how each of the following may be obtained from acetaldehyde :—(a) acetic acid, (b) methane, (c) ethyl alcohol, (d) ethylene.

[67 marks.]

8. Compare and contrast, with regard to properties and constitution, the following substances :—starch, cane (beet) sugar, glucose.

Show concisely how glucose may be obtained from starch and how ethyl alcohol may be obtained from cane sugar.

[67 marks.]

9. Give a brief account of the allotropic modifications of carbon. Contrast the properties of carbon monoxide with those of carbon dioxide.

Describe how you would establish experimentally the chemical formula for carbon monoxide.

[67 marks.]

10. What is meant by the following terms :—

(a) molecular weight, (b) valency, (c) basicity of an acid ?

Give an outline of how you would show by experiment (i) that sulphuric acid is di-basic, (ii) that aluminium is trivalent.

50 c.c. of a solution of a di-basic acid, the solution containing 2 gm. of the acid per litre, are neutralized by 15.9 c.c. of a 0.1N solution of alkali. Calculate the molecular weight of the acid.

[67 marks.]