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(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS.
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1931.

HONOURS.

CHEMISTRY.

FRIDAY, 12th JUNE.—AFTERNOON, 4 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 by sketches wherever possible.

1. One gram of a mixture of calcium carbonate and barium carbonate was completely dissolved in 150 c.c. of decinormal hydrochloric acid; 10.1 c.c. of 0.9 N/10 sodium hydroxide were required to neutralize the excess acid. Determine the percentage of each constituent in the original mixture. (Ca=40; Ba=137; C=12; O=16; H=1; Cl=35.5; Na=23.)

2. Explain what is meant by the term 'allotropy.' Illustrate your answer by reference to the allotropes of (a) sulphur, (b) phosphorus.

3. Explain what is meant by the following terms:—(a) dissociation, (b) gram-molecular volume, (c) basicity of an acid, (d) unsaturated compound, (e) valency. Give one example in each case.

4. Describe how a dry specimen of gaseous ammonia may be prepared. How may the volumetric composition of the gas be determined?

5. Describe tests whereby you would distinguish between :

- (a) Magnesium sulphate and zinc sulphate.
- (b) Aluminium sulphate and ferric sulphate.
- (c) Sodium nitrate and sodium nitrite.
- (d) Sodium chloride and sodium bromide.
- (e) Sodium sulphate and sodium sulphite.

6. Describe a commercial method for the production of sodium carbonate from sodium chloride

7. Prove the relationship existing between the molecular weight of a substance and its vapour density.

Describe fully Victor Meyer's method for the determination of the molecular weight of a volatile liquid.

8. Describe, with all essential practical details, how the percentage amount of the sulphate radicle in a sample of copper sulphate may be determined.

9. How would you prepare a pure sample of acetaldehyde ? Write the structural formula of the aldehyde.

10. State Dulong and Petit's Law. A metallic sulphide, on analysis, was found to contain 18.78 per cent. of sulphur. The chemical equivalent of sulphur is 16.034, and the specific heat of the metal is 0.0303. Find the atomic weight and valency of the metal.