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(Department of Education).

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

LEAVING CERTIFICATE EXAMINATION, 1932.

HONOURS.

CHEMISTRY.

FRIDAY, 3rd 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 pyrolusite (an ore consisting chiefly of manganese dioxide) when heated with excess of hydrochloric acid yielded 250 c.c. of chlorine at 15°C and 750 mm. pressure. Determine the percentage of manganese dioxide in the pyrolusite. ($Mn=55$; $Cl=35.5$; $O=16$; $H=1$. Gram. molecular volume$=22.4$ litres at S. T. P.)

2. What is meant by the term "nascent"? Give two examples, in each case, of reactions brought about by the use of (*a*) nascent hydrogen, (*b*) nascent oxygen.

3. Describe, with all essential practical details, how the percentage of chlorine in potassium chloride may be determined.

4. Describe, with the aid of a sketch, the method you would employ to prepare a pure sample of liquid nitrogen peroxide. Describe the physical and chemical changes in this substance under the influence of change of temperature.

5. Describe experiments illustrating the phenomenon known as "The Diffusion of Gases." State Graham's Law of Diffusion.

6. Give the names and formulæ of two naturally-occurring compounds containing phosphorus. Describe a method for the production of phosphorus, and state any method you know for the purification of the element.

7. A gaseous mixture is known to contain carbon monoxide, carbon dioxide, nitrogen and oxygen. Suggest a scheme for determining the percentage by volume of each constituent in the mixture.

8. A solution is known to contain 40 grm. of a mixture of ferrous sulphate ($FeSO_4 \cdot 7H_2O$) and potassium sulphate per litre. In a titration 25 c.c. were found to require 23 c.c. of $1 \cdot 2 \ \frac{N}{10}$ potassium permanganate. Determine the percentage composition of the original mixture. Describe fully how you would carry out the titration. (Fe=56; Mn=55; K=39; S=32; O=16; H=1.)

9. Describe with the aid of a sketch, the operations involved in the production of Portland Cement. What chemical changes take place during " setting " of the cement?

10. What is the chemical nature of a fat? Write down a formula illustrating its composition. What changes take place when a fat is heated with (a) sulphuric acid; (b) sodium hydroxide. Indicate the commercial importance of these reactions.