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(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1948.

CHEMISTRY.—HONOURS.

WEDNESDAY 23rd 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: O=16; N=14; Cl=35·5; Na=23; S=32. The Gram-molecular volume=22·4 litres.]

1. State the Law of Multiple Proportions, and show how it is explained by the Atomic Theory. A metal forms three oxides which contain 76·47, 68·42 and 52·0 per cent. of metal respectively. Show how these compounds illustrate the law.

2. Describe, with a sketch of the apparatus, a method for the preparation of dry ammonia gas.
500 c.c. of ammonia and 456 c.c. of hydrogen chloride both measured at 13°C. and 720 mm., were mixed.
Calculate the weight of the solid product.

3. Name three gaseous oxides which react with potassium hydroxide solution and explain the reactions which take place. Give three tests, one in each case, by which you would identify any three of the products formed in these reactions.

4. Describe a method for the extraction of aluminium from its ores. How are aluminium oxide, aluminium hydroxide and aluminium chloride obtained from the metal?

5. Define

(*a*) equivalent weight of a metal,

(*b*) equivalent weight of an acid.

0·76 gram. of a metal was dissolved in 100 c.c. of normal sulphuric acid, and 37·5 c.c. of normal caustic soda were required to neutralise the excess acid. If the specific heat of the metal is 0·25, find its exact atomic weight.

6. How are slaked lime and cement manufactured ?

7. Describe a method for the preparation of white phosphorus from calcium phosphate. Indicate how (*a*) white phosphorus may be converted to the red form, (*b*) red phosphorus may be converted to the white form.

8. Describe the preparation and properties of nitrous oxide. How would you prove that the gas contains nitrogen and oxygen ?

9. Describe any method for the preparation of :—

(*a*) cupric oxide from copper,

(*b*) silver oxide from silver,

(*c*) red lead from lead,

(*d*) sulphur trioxide from sulphur.

10. Give an account of an important discovery made by *one* of the following :—

Gay Lussac, Cannizarro, Mendeleéff.

11. Write the structural formula for acetaldehyde, and give the names and structural formulae for the products of oxidation and reduction.

12. Give the structural formula for glucose, and describe the action of yeast on a glucose solution.