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LEAVING CERTIFICATE EXAMINATION, 1951.

CHEMISTRY.—PASS.

WEDNESDAY, 13*th 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; C=12; Ca=40.

The Gram-molecular volume = 22·4 litres.

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1. Define equivalent, valency, atomic weight and show that there is a relationship between them.

How would you measure the equivalent weight of aluminium?

2. Describe, giving a sketch of the apparatus, a method for the preparation of dry ammonia in the laboratory. Give an account of the properties of ammonia and indicate how it acts on (*a*) chlorine, (*b*) hydrogen chloride.

3. Where is uncombined sulphur found and how is it purified?

Name the allotropes of sulphur and describe the properties of any two of them.

4. State the volume composition of steam and describe, with the aid of a sketch, an experiment in support of your answer.

How has the result of this experiment been used to establish the formula for steam?

5. Describe the preparation of phosphorus from one of its ores.

How would you convert phosphorus to metaphosphoric acid?

6. Give the meaning of the following terms, illustrating your answer in each case by one suitable example:—

(*a*) Catalysis; (*b*) reduction; (*c*) double decomposition; (*d*) saturated solution.

7. Describe the action of heat on :

(*a*) nitric acid ; (*b*) copper nitrate ; (*c*) ammonium nitrite ; (*d*) sodium bicarbonate ; (*e*) potassium chlorate.

8. Describe, giving a sketch of the apparatus, the preparation of dry hydrogen chloride in the laboratory. How would you show that

(*a*) the gas contains chlorine,

(*b*) a mass of the gas contains half its volume of hydrogen ?

9. Give the meaning of the following terms and in each case illustrate your answer by one suitable example :

(*a*) basic oxide ; (*b*) acid anhydride ; (*c*) neutralisation ; (*d*) tribasic acid.

10. Describe how you would obtain three of the following from a dilute aqueous solution of copper sulphate :

(*a*) water ; (*b*) crystals of copper sulphate ;

(*c*) copper ; (*d*) a solution of sulphuric acid.

11. A sample of impure chalk weighed 5 grams, and, when dissolved in an excess of dilute hydrochloric acid, gave 588 c.c. of carbon dioxide measured at 780 mm. pressure and 21°C. Calculate the percentage of calcium carbonate in the sample of chalk.
Sketch the apparatus which could be used in this experiment.

12. How would you distinguish between :

(*a*) potassium chlorate and potassium chloride,

(*b*) sodium chloride and ammonium chloride,

(*c*) potassium nitrate and ammonium nitrate,

(*d*) ferrous sulphide and ferric oxide ?