

# AN ROINN OIDEACHAIS

(Department of Education).

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LEAVING CERTIFICATE EXAMINATION, 1949.

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## CHEMISTRY.—PASS.

FRIDAY, 17th JUNE.—MORNING, 10 to 12.

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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.

The gram-molecular volume = 22.4 litres.

Atomic weights, C = 12; O = 16; Ca = 40.

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1. State briefly the Atomic Theory as enunciated by Dalton. In what way was this theory defective and how did Avogadro and Cannizzaro overcome the defects?

2. State the Law of Constant Composition.

If you were supplied with copper nitrate and copper carbonate, state

(a) how you would prepare from each a specimen of copper oxide,

(b) how you would use these specimens to test the Law of Constant Composition.

3. Explain the difference between temporary and permanent hardness in water. Name substances which cause permanent hardness in water and describe how they may be removed by chemical means.

4. Describe briefly the action of (a) heat, (b) sodium hydroxide solution, on ammonium nitrate, lead nitrate, and concentrated nitric acid.

5. How would you prepare dry hydrogen and show that it forms a liquid when it burns in air?

How would you show that the liquid is pure water?

6. How would you find by experiment the weight of carbon dioxide that could be obtained from one gram of calcium carbonate? What volume of carbon dioxide, measured at  $15^{\circ}$  C. and 720 mm., could be obtained from one gram of calcium carbonate?

7. Describe, with a sketch of the apparatus, the preparation and collection of hydrogen chloride in the laboratory.

How can it be shown that a given mass of hydrogen chloride contains half its volume of hydrogen?

8. Describe, with a sketch of the apparatus, the preparation of an aqueous solution of ammonia in the laboratory.

Describe the action of ammonia solution on (a) chlorine, (b) a solution of copper sulphate.

9. Describe the action of heat on

- (a) silver nitrate,
- (b) sodium bicarbonate,
- (c) crystalline ferrous sulphate,
- (d) ammonium nitrite.

10. Describe the preparation of three acids from phosphorus, and explain the action of any one of them on sodium hydroxide.

11. How is hydrogen sulphide usually prepared in the laboratory?

How does it react with

- (a) sulphur dioxide,
- (b) a solution of lead nitrate?

12. How would you prepare

- (a) lead sulphate from lead,
- (b) zinc carbonate from zinc,
- (c) stannic chloride from tin,
- (d) sodium carbonate from sodium hydroxide?