



1934

Elementary Chemistry (1st Year): Technical School Examinations 1934

Department of Education: Technical Instruction Branch

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COURSES IN APPLIED CHEMISTRY.

AN ROINN OIDEACHAIS.

(Department of Education.)

BRAINSE AN CHEÁRD-OIDEACHAIS.

(Technical Instruction Branch.)

TECHNICAL SCHOOL EXAMINATIONS.

1934.

ELEMENTARY CHEMISTRY.

(First Year.)

Thursday, May 3rd—7 to 10 p.m.

Examiner—A. G. G. LEONARD, ESQ., PH.D., F.R.C.S.C.I., F.I.C.

Co-Examiner—E. P. BARRETT, ESQ., B.A., B.SC.

GENERAL INSTRUCTIONS.

You are carefully to enter on the Answer Book and Envelope supplied your Examination Number and the subject of examination, but you are not to write your name on either. No credit will be given for any Answer Book upon which your name is written, or upon which your Examination Number is not written.

You must not have with you any book, notes, or scribbling-paper.

You are not allowed to write or make any marks upon your paper of questions.

You must not, under any circumstances whatever, speak to or communicate with another candidate; and no explanation of the subject of the examination may be asked for or given.

You must remain seated until your Answer Book has been taken up, and then leave the examination-room quietly. You will not be permitted to leave before the expiration of twenty minutes from the beginning of the examination, and will not be re-admitted after having once left the room.

If you break any of these rules, or use any unfair means, you are liable to be dismissed from the examination, and your examination may be cancelled by the Department.

Three hours are allowed for this paper. Answer Books, unless previously given up, will be collected at 10 p.m.

INSTRUCTIONS.

Read the General Instructions on page 1.

- (a) Equal values are attached to the questions.
- (b) Answers must be written in *ink*.
- (c) Write the number of the question distinctly in the margin of your paper before the answer.
- (d) *Eight, but not more than eight*, questions may be attempted.
- (e) *Well defined chemical changes should be represented by equations.*

1. Describe in detail how you would prepare dry crystalline specimens of copper sulphate and barium nitrate, starting from copper oxide and barium carbonate respectively.

2. State the Law of Multiple Proportions and show how Dalton's Atomic Theory gives an explanation of the law.

3. What volume of ammonia measured at 13°C and 779 mms. would be required to give on neutralization 10.7 grams of ammonium chloride?

The gram molecular volume of a gas at S.T.P. is 22.4 litres. $\text{H}=1$; $\text{N}=14$; $\text{Cl}=35.5$.

4. Mention two bleaching agents. State the conditions necessary for their action and explain by equations the reactions supposed to take place so as to cause bleaching.

5. 0.28 gram of a gas occupied 241 c.c. at 17°C and 750 mms. Find the relative density and molecular weight of the gas. 1 litre of hydrogen at S.T.P. weighs 0.09 gram.

6. Explain the meaning of "reduction" and "oxidation." Illustrate your answer by reference to hydrogen, chlorine, oxygen and carbon monoxide.

7. What do you understand by "allotropy"? Explain your answer by reference to sulphur.

8. State Avogadro's Hypothesis and Gay Lussac's Law of Volumes. Give equations for interaction of the under-mentioned substances and state the volume relationships in each case. (a) Hydrogen and chlorine; (b) hydrogen and oxygen; (c) hydrogen and nitrogen.

9. How is oxygen usually prepared (a) in the laboratory, (b) commercially? Give some industrial application of oxygen.

10. Give equations for the interaction of hydrochloric acid and the following substances, naming the products formed in each case—(a) sodium bicarbonate; (b) ferrous sulphide; (c) slaked lime; (d) manganese dioxide; (e) potassium hydroxide.

11. What do you understand by "normal" and "acid" salts? Give examples.

50 c.c. of a solution containing 40 grams of sodium hydroxide per litre was neutralized by 48 c.c. of a sulphuric acid solution. What weight of sulphuric acid was contained in a litre of its solution?— $\text{H}=1$; $\text{O}=16$; $\text{Na}=23$; $\text{S}=32$.

12. Describe a laboratory method for the preparation of nitric acid.

Give two examples of the use of nitrates in industry.