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(Department of Education).
BRAINSE AN MHEAN-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1939.

FULL COURSE.

CHEMISTRY.

FRIDAY, 16th JUNE.—AFTERNOON, 4 P.M. 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 with sketches wherever possible.

[H=1, C=12, O=16, Na=23, S=32, Cl=35.5, Zn=65.5. Gram-molecular volume of a gas=22.4 litres at S.T.P.]

1. Give an account of the laboratory preparation of carbon monoxide.

Summarize the properties of the gas.

Why is (a) carbon monoxide regarded as a neutral oxide?

(b) carbon dioxide regarded as an acid anhydride?

How would you determine the percentage composition by volume of a mixture of carbon monoxide and carbon dioxide?

2. What is meant by the "atomic heat" of an element?

If the specific heat of iodine be 0.054, find an approximate value for the atomic weight of iodine.

2.3615 grams of silver were converted into silver iodide, giving 5.1398 grams of the iodide. Another 2.3615 grams of silver were converted into silver chloride, giving 3.1377 grams of the chloride. The equivalent of chlorine is 35.46. Find the exact atomic weight of iodine.

3. Starting with (say) 10 grams of the correct metal in suitable physical condition, in each case, how would you prepare reasonable quantities of any *three* of the following compounds in fair degrees of purity:—

(a) lead nitrate, (b) lead sulphate, (c) green vitriol, (d) stannic chloride, (e) cupric sulphide?

4. What is meant by a decinormal solution of a substance ?

16.40 grams of a sample of dilute sulphuric acid were mixed with distilled water and the solution made up to 500 c.c. 20.4 c.c. of this solution exactly neutralized 20 c.c. of N/10 caustic soda solution. What was the percentage, by weight, of sulphuric acid in the original sample ?

5. Describe *one* modern process for the preparation of *industrial* chlorine.

Mention *two* uses for industrial chlorine.

6. In what way may methane be prepared in the laboratory ?

Describe the properties of the gas.

How may methane be converted into methyl chloride ?

7. Explain the following terms, illustrating your answer by *one* suitable example in each case :—

(a) allotropy, (b) catalytic agent, (c) basicity, (d) double decomposition, (e) indicator.

8. What is the essential difference between a " carbohydrate " and a " fat " ?

Give the composition of a typical fat and explain how a fat may be converted into (a) a soft soap, (b) a hard soap.

9. What is the action of heat on *any five* of the following :—

(a) ammonium nitrate, (b) mercuric oxide, (c) lead nitrate, (d) sodium bicarbonate, (e) temporarily hard water, (f) magnesium in an atmosphere of nitrogen, (g) potassium chlorate ?

10. A sample of impure zinc carbonate contains 5 per cent., by weight, of zinc oxide as the impurity. What is the maximum volume of carbon dioxide, measured dry at 27° C. and 750 mms. pressure, which could be obtained by the action of dilute hydrochloric acid on 10 grams of the impure zinc carbonate ?

11. Describe the *commercial* preparation, by the leaden chamber process, of sulphuric acid, explaining the function in the plant of (a) the Glover tower, (b) the Gay Lussac tower.

12. Describe briefly the more important attempts that have been made to classify the chemical elements.

Select *two* elements from any *one* Group in the Periodic Table and point out the main physical and chemical similarities between the elements you have chosen.