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(Department of Education.)

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1941.

HONOURS.

CHEMISTRY.

THURSDAY, 19th 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 suitable sketches.

(H=1, O=16, S=32, Ba=137.5. Gram-molecular volume of a gas or vapour=22.4 litres at S.T.P.)

1. Explain the following terms, illustrating your answer by one suitable example in *each* case—(a) Supersaturated solution, (b) water of crystallization, (c) catalysis, (d) halogen, (e) hydrolysis.

2. In a determination of the vapour density of a pure volatile liquid, by the method of Victor Meyer, the following results were obtained—

Weight of volatile liquid used = 0.177 gram.

Volume of air (considered "dry") displaced = 58.7 c.c.

Temperature of air collected = 16° C.

Pressure of air collected = 744 mms.

Find (a) the vapour density of the substance, and
(b) its molecular weight.

3. What adjustments may have to be made on a laboratory balance before it is ready for use?

Indicate fully how you would use the balance, and mention the precautions which should be taken.

4. Compare and contrast the modes of preparation and the physical and chemical properties of carbon dioxide and sulphur dioxide.

5. A slight excess of barium chloride solution was added to 50 c.c. of dilute sulphuric acid. 7.55 grams of barium sulphate were precipitated. Express the concentration of the sulphuric acid solution (a) in grams per litre, (b) in terms of normality.

What volume of the given sulphuric acid solution should be diluted to 400 c.c. so that the final solution would be exactly normal?

6. Explain how the main constituents of liquid air may be separated.

7. Starting with a mixture of calcium carbonate and sodium carbonate how would you prepare fairly pure samples of calcium chloride and sodium sulphate?

8. Name two metals *each* of which forms two chlorides, and write the names and molecular formulae of the chlorides formed.

In the case of *one* metal state how each of the two chlorides could be prepared in reasonably pure condition.

9. Describe the preparation, physical properties, chief reactions and common uses of acetylene.

What is the empirical formula of acetylene?

10. Using ammonia as the sole primary source of nitrogen indicate *schematically* how a sample of (a) nitric oxide, (b) nitrous oxide, could be prepared.

11. How may the presence of (a) carbon, (b) hydrogen, (c) nitrogen in a given organic compound be confirmed experimentally?

12. Write a short account of the advantages derived from the classification of elements according to Mendeléeff's "Periodic Law," and mention some defects in this system of classification.