AN ROINN OIDEACHAIS

(Department of Education.)

LEAVING CERTIFICATE EXAMINATION, 1942.

CHEMISTRY.—PASS.

FRIDAY, 12*th JUNE*—AFTERNOOG, 4 P.M. TO 6 P.M.

(*a*) Not more than *six* questions to be attempted. 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.

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1. What is meant by the "equivalent weight" of a substance ? 1·31 grams of a certain metal were completely converted into the chloride of the metal, and 2·73 grams of the chloride were obtained. Calculate the equivalent of the metal. [Cl=35·5.]

2. Mention one ore of each of the following :—(*a*) lead, (*b*) zinc, (*c*) tin. How would you distinguish between samples of zinc nitrate and lead nitrate ?

3. Give a description of the allotropes of carbon. How may it be shown that these allotropes are different modifications of the same element ?

4. What is the maximum volume of oxygen, measured at 27° C. and 780 mms. pressure, which could be obtained by the decomposition of 10 grams of potassium chlorate ?

(O=16, Cl=35·5, K=39 ; Gram-molecular volume of a gas=22·4 litres at S.T.P.)

5. Which of the following compounds are soluble in water :—(*a*) calcium carbonate, (*b*) ferrous sulphate, (*c*) sodium carbonate, (*d*) aluminium hydroxide, (*e*) copper nitrate ? Write the molecular formulæ of any *four* of the foregoing compounds.

6. Starting with a dilute solution of caustic potash and a dilute solution of hydrochloric acid how would you proceed to prepare a *pure* dry sample of potassium chloride ?

7. State the Law of Reciprocal Proportions.

Illustrate the Law by reference to the gravimetric compositions of methane, carbon dioxide, and water.

(H=1, C=12, O=16.)

8. Describe fully the changes which occur when :—

(*a*) hydrogen sulphide is led through a solution of copper sulphate,

(*b*) sodium chloride solution is added to a solution of silver nitrate,

(*c*) ammonium nitrate is heated.

9. Write an account of the preparation and properties of acetylene. Mention one way in which acetylene is used commercially.

10. Sketch the apparatus which is used in the laboratory for the conversion of sulphur dioxide into sulphur trioxide. What reaction takes place when

(*a*) sulphur dioxide is mixed with water,

(*b*) sulphur trioxide is mixed with water ?

11. Describe the preparation and properties of acetic acid.

Assuming that it is a monobasic acid, describe how you could determine its molecular weight by a titration method.

12. Write a description of one method by which the vapour density of a volatile liquid may be determined.