AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1957.

CHEMISTRY.—PASS.

WEDNESDAY, 12th JUNE.—AFTERNOON, 3 TO 5.30.

Not more than six questions may be attempted.
Chemical changes should be expressed by equations as well as in words.

Gram-molecular volume=22·4 litres.

Atomic weights: H=1, C=12, O=16, Na=23, P=31, Ca=40.

1. (*a*) Explain the term "diffusion" and describe an experiment which demonstrates the diffusion of gases.

(*b*) What are colloids? Describe any method for the preparation of a colloidal solution.

[66 marks.]

2. Outline Dalton's Atomic Theory.

Explain what is meant by (i) electron, (ii) proton, (iii) neutron.

Draw a sketch to illustrate the structure of the atom of any named element.

[66 marks.]

3. Describe the preparation and properties of carbon dioxide.

Calculate the volume of carbon dioxide, at a pressure of 745 mm. of mercury and at a temperature of 17°C., obtained by the action of excess hydrochloric acid on 2 grams of anhydrous sodium carbonate.

[66 marks.]

4. Define the chemical equivalent of an element.

Describe exactly how you would measure the chemical equivalent of magnesium by displacement of hydrogen.

461 c.c. of hydrogen at S.T.P. were obtained by the action of excess acid on 0·5 grams of magnesium. Calculate the equivalent of magnesium.

[66 marks.]

5. What causes (*a*) permanent hardness, (*b*) temporary hardness, in water?

Describe a chemical method for removing permanent hardness from water.

Discuss the disadvantages of using hard water.

[66 marks.]

6. Describe with the aid of a sketch of the apparatus how you would prepare and collect dry chlorine.

Give an account of the properties of chlorine.

Describe the action of chlorine on (i) cold dilute caustic soda solution, (ii) hot concentrated caustic soda solution.

[66 marks.]

7. Give an account of how you would prepare and collect nitrous oxide and describe its properties.

Give the name and formula of each of the other oxides of nitrogen.

[67 marks.]

8. Name two acids of phosphorus, write their chemical formulae and describe how they may be prepared from phosphorus.

Calculate the percentage of phosphorus in calcium phosphate.

[67 marks.]

9. Describe how you would prepare and collect hydrogen sulphide.

Give an account of the physical and chemical properties of hydrogen sulphide, and describe how you would measure its volume composition.

[67 marks.]

10. What is meant by vapour density ?

Describe how you would measure the vapour density of a volatile substance.

Show that the molecular weight of a substance is twice its vapour density.

[67 marks.]