AN ROINN OIDEACHAIS
(Department of Education)

LEAVING CERTIFICATE EXAMINATION, 1960.

CHEMISTRY.— HONOURS.

MONDAY, 20th *JUNE*.—Morning, 10 to 12.30.

Not more than six questions may be attempted.

Atomic Weights : C=12, O=16, K=39, Mn=55, Fe=56.

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1. Give an account of an industrial method for the manufacture of (*a*) slaked lime, (*b*) bleaching powder.
Describe and explain two important uses of each of these substances.

[66 marks.]

2. Name (*a*) a saturated hydrocarbon, (*b*) an unsaturated hydrocarbon, (*c*) a carbohydrate. Write the structural formula of each of the compounds you have named and give an account of the chief chemical reactions of these compounds. In the case of the unsaturated hydrocarbon you have named, state the evidence on which its structural formula is based.

[66 marks.]

3. Describe fully how you would measure the volume composition of (*a*) carbon dioxide, (*b*) carbon monoxide.

[66 marks.]

4. Give an account of the use of the following reagents in qualitative analysis : (*a*) potassium hydroxide, (*b*) hydrogen sulphide, (*c*) ammonium sulphide, (*d*) ammonium carbonate, (*e*) silver nitrate. Illustrate your answer by means of examples.

[66 marks.]

5. State the positions occupied by sodium and chlorine in the Periodic Table and give an account of the properties of these elements. How may the dissimilarity in their chemical properties be accounted for ?
Describe the structure of (*a*) an atom of sodium, (*b*) an atom of chlorine, (*c*) a molecule of sodium chloride.

[66 marks.]

6. Give an account of (*a*) Avogadro's hypothesis, (*b*) Graham's law of diffusion of gases, (*c*) Dulong and Petit's law.

Discuss the application of these laws in finding molecular and atomic weights.

[66 marks.]

7. Describe fully how you would measure the chemical equivalent of copper (*a*) by oxidising it, (*b*) by displacing it from one of its salts by another metal.

[67 marks.]

8. Give an account of the physical properties of ammonia and of three chemical tests to identify it.

Using ammonia as the sole source of nitrogen, describe how a sample of (*a*) nitrogen, (*b*) nitric oxide, (*c*) nitric acid, (*d*) nitrous oxide, may be prepared and illustrate by chemical equations the reactions involved.

[67 marks.]

9. Give an account of the chief chemical reactions of monobasic organic acids.

Describe three chemical reactions of formic acid which distinguish it from acetic acid.

44·4 c.c. of a normal solution of an alkali were required to neutralize 2 gms. of a di-basic organic acid and when 2 gms. of the acid were burned in oxygen, 1·95 gm. of carbon dioxide and 0·4 gm. of water were formed. Find the molecular formula for the acid and write its structural formula.

[67 marks.]

10. 0·28 gm. of pure iron was dissolved in dilute sulphuric acid and the solution was made up to 250 c.c. It was found that 10 c.c. of a solution of potassium permanganate were required to oxidise 25 c.c. of the diluted solution. Calculate the strength of the potassium permanganate solution (*a*) in grams per litre, (*b*) in terms of normality.

Describe fully how you would perform the operations mentioned above and write equations for the reactions which take place.

[67 marks.]