1933-01-01

Inorganic Chemistry (3rd Year): Technical School Examinations 1933

Department of Education: Technical Instruction Branch

COURSES IN APPLIED CHEMISTRY.

AN ROINN OIDEACHAIS.
(Department of Education.)

BRAINSE AN CHEARD-OIDEACHAIS.
(Technical Instruction Branch.)

TECHNICAL SCHOOL EXAMINATIONS.
1933.

INORGANIC CHEMISTRY.
(Third Year.)

Tuesday, May 16th—7 to 10 p.m.

Examiner—A. G. G. LEONARD, ESQ., PH.D., F.R.C.SC.I., F.I.C.

Co-Examiner—SEOSAMH ÓCIARDHUBHÁIN, M.SC.

GENERAL INSTRUCTIONS.

You are carefully to enter on the Answer Book and Envelope supplied your Examination Number and the subject of examination, but you are not to write your name on either. No credit will be given for any Answer Book upon which your name is written, or upon which your Examination Number is not written.

You must not have with you any books, notes, or scribbling paper.

You are not allowed to write or make any marks upon your paper of questions.

You must not, under any circumstances whatever, speak to or communicate with another candidate ; and no explanation of the subject of the examination may be asked for or given.

You must remain seated until your answer-book has been taken up, and then leave the examination room quietly. You will not be permitted to leave before the expiration of twenty minutes from the beginning of the examination, and will not be re-admitted after having once left the room.

If you break any of these rules, or use any unfair means, you are liable to be dismissed from the examination, and your examination may be cancelled by the Department.

Three hours are allowed for this paper. Answer-books, unless previously given up, will be collected at 10 p.m.

INSTRUCTIONS.

Read the General Instructions on page 1.

(*a*) Equal values are attached to the questions.

(*b*) Answers must be written in *ink*.

(*c*) Write the number of the question distinctly in the margin of your paper before the answer.

(*d*) *Six*, but *not more than Six* questions may be attempted.

(*e*) Wherever possible, chemical changes should be indicated by equations, and laboratory or factory operations should be illustrated by sketches.

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1. How are quicklime and plaster of paris manufactured? Discuss the manner in which (*a*) mortar and (*b*) plaster of paris set.

2. Explain how the degree of dissociation of a salt in solution may be ascertained from freezing point and conductivity measurements respectively. (You need not describe the experimental methods).

3. Excess of potassium iodide and of potassium iodate were added to 50 c.c. of a solution of sulphuric acid. The iodine liberated was titrated with 1·02 deci-molecular sodium thiosulphate solution and required 24·5 c.c. of the latter. What was the normality of the sulphuric acid solution?

4. What is the principal ore of mercury and how is mercury obtained from it.

How are calomel and corrosive sublimate prepared?

5. Mention three alloys in common use. State the metals of which each is composed and outline the method you would employ to determine the percentage of each metal in any *one* of the alloys.

6. Describe a process used industrially for the extraction of a metal from a sulphide ore.

7. Write down, with approximate atomic weights, the elements of any one sub-group in the periodic table. Compare the properties of the elements with a view to justifying the classification.

8. Describe a process for the manufacture of sodium carbonate. How would you test a specimen of the salt for traces of (*a*) chloride, (*b*) sulphate?

9. Plot a freezing point composition graph for the magnesium nickel alloys from the data given below.

What deductions can you make from the graph? Explain what would happen if the alloy containing 95 per cent. of nickel were allowed to cool from a temperature of 1400° C.

Mg = 24·4; Ni = 58·7.

% Ni	% Mg	Freezing Point, °C.
—	100	650
10	90	630
20	80	590
30	70	540
40	60	680
50	50	920
60	40	1040
70	30	1120
80	20	1145
85	15	1140
90	10	1080
95	5	1270
100	—	1450