

**AN ROINN OIDEACHAIS**  
(Department of Education.)

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**LEAVING CERTIFICATE EXAMINATION, 1947.**

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**CHEMISTRY.—HONOURS.**

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**WEDNESDAY, 18th JUNE.—MORNING, 10 to 12.**

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Not more than six questions to be answered. All the questions have the same value.

Chemical changes should be expressed by equations as well as in words.

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[Atomic weights: Ag=108; Cl=35.5; Na=23; C=12; O=16; wt. of litre of hydrogen at S.T.P.=0.09 grm.]

1. Sketch an apparatus for generating hydrogen sulphide automatically in the laboratory and explain how it operates. Write a brief note on the use of hydrogen sulphide in qualitative analysis.
2. If you were given a solution of ammonia, how would you proceed to prepare a sample of pure nitrogen? How does nitrogen prepared from ammonia differ from nitrogen prepared from the air?
3. What is meant by the equivalent of an element and how is it related to the atomic weight?  
0.917 gram of the chloride of an element was dissolved in water and treated with an excess of a solution of silver nitrate. The precipitate formed weighed 1.435 gram. Find the equivalent of the element. If the specific heat of the element is 0.055, find its exact atomic weight.

4. Describe, with diagram of apparatus, Victor Meyer's method for the determining of the vapour density of a liquid.

In a Victor Meyer apparatus 0.06 gram of a liquid displaced 82.4 c.c. of air measured over water). Find the vapour density of the liquid and its approximate molecular weight.

[Room temperature=15°C.; atmospheric pressure=732 mm.; pressure of aqueous vapour at 15°C.=12 mm.]

[P.T.O.]

5. Give a short account of the method of preparation and chief properties of each of the following substances: (a) bleaching powder; (b) potassium nitrite; (c) zinc sulphide; (d) precipitated chalk.

6. If you were given pure dry sodium carbonate, how would you proceed to prepare normal solutions of sodium carbonate and of sulphuric acid?

18 cc. of normal acid exactly neutralised 1 gram of an impure sample of sodium carbonate. What was the percentage of sodium carbonate in the sample?

7. Describe the phenomena that take place when an electric current is passed through a dilute solution of sulphuric acid (using platinum electrodes), and explain the chemical changes that take place during the passage of the current.

8. Describe a process for the manufacture of nitric acid and give a brief account of the properties of this acid.

9. Write structural formulæ for methane and for ethylene, and describe fully the reactions that take place when each of them is treated with chlorine. Give equations to illustrate the reactions.

10. Write the structural formula for ethyl alcohol, and describe the reaction that takes place when it is treated with (a) a mixture of potassium dichromate and sulphuric acid; (b) a mixture of iodine and phosphorus.

11. What is the chief carbon compound in the potato? How are (a) glucose, and (b) alcohol made from potatoes?

12. Select any three of the following chemists and give brief accounts of discoveries with which they were connected (one discovery for each): (a) Graham; (b) Ramsay; (c) Scheele; (d) Mendeléeff.