

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1949.

SCIENCE (Syllabus A).

FRIDAY, 17th JUNE.—MORNING, 10 TO 12.

[Not more than *six* questions are to be attempted, of which *three* must be taken from Section I, and *three* from Section II. Illustrate your answers wherever possible. All questions are of equal value.]

SECTION I.

1. Describe and explain how the Principle of Archimedes may be applied to measure (a) the specific gravity of a liquid, (b) the volume of a small stone.

2. Describe fully how you would measure the weight of a litre of air at room temperature and atmospheric pressure. How is the density of air affected by changes in temperature and pressure?

3. What is the difference between evaporation and boiling?

What factors affect (a) the boiling point and (b) the rate of evaporation of water? Describe experiments in support of your answer to (a).

4. Describe fully an experiment to measure the coefficient of expansion of air and explain how the coefficient is calculated from the measurements made in the experiment.

A flask of capacity 500 c.c. is heated to 100° C. and sealed. The flask is inverted and opened under water at 15° C., and the water levels are adjusted. What volume of water enters the flask?

5. A kettle of specific heat 0.2 weighs 980 grams and has a capacity of 2 litres. The kettle is filled with water at 15° C. and placed over a heater which supplies heat at the rate of 300 calories per second. Calculate how long it will take to boil the kettle.

Explain why the actual time taken would be greater than the calculated time.

SECTION II.

6. Describe experiments to investigate the causes of the rusting of iron and state clearly what can be deduced from each of the experiments.

Mention and explain two methods by means of which the rusting of iron may be retarded.

7. Describe fully an experiment to examine the effect of heat on a few crystals of green vitriol (ferrous sulphate).

Describe the changes which may be observed during the experiment, and write down the names and properties of the products obtained.

8. Of what elements is water composed ?

Describe with the aid of diagrams two different experiments in support of your answer.

By whom was the composition of water first discovered ?

9. Describe fully how you would prepare and collect sulphur dioxide and give an account of its physical and chemical properties. How would you show by experiment that it is composed of sulphur and oxygen ?

10. Describe fully an experiment to measure the weight of 1,000 c.c. of carbon dioxide at S.T.P., and show clearly how you would make the required calculation from the measurements made in the experiment.