

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1946.

(SCIENCE Syllabus D).

WEDNESDAY, 19th JUNE.—MORNING, 10 TO 12.

[Not more than *six* questions 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. State the law of the spiral spring.

Describe how you would use an ungraduated spiral spring and a known weight to weigh a given object (*a*) in air, (*b*) in water.

How would you calculate the volume of the object from these weighings?

2. Write down the law of flotation and describe an experiment to test the law in the case of any given liquid.

A lump of butter floats in water with $\frac{1}{6}$ of its total volume projecting above the surface. Find the density of the butter in gms. per c.c.

What is the least force which would keep a pound of butter under the surface of water?

3. The waste pipe of a kitchen sink is stopped and the sink is full of water. Describe how you would use a piece of rubber tubing to empty the contents of the sink into a bucket and explain your method fully.

4. What do you understand by evaporation?

In what respects is evaporation different from boiling?

How would you show in the laboratory that heat is absorbed when a liquid evaporates? What is the absorbed heat called?

Give two everyday examples of the lowering of temperature as a result of evaporation.

5. In olden times heated bricks and heated lumps of metal were used as bed-warmers. Explain why the hot-water bottle method is more efficient, and describe a laboratory experiment in support of your explanation. Explain, also, how the water in the bottle gets cold eventually. What kind of surface would you recommend for the bottle and why?

SECTION II.

6. Describe fully with the aid of a diagram how you would find by experiment the percentage of oxygen and nitrogen in ordinary air. In what respects are these gases different from one another? Explain the importance of proper ventilation in dwelling houses.

7. Describe the appearance and properties of each of the following substances: (a) washing soda, (b) caustic soda, (c) tartaric acid. In the case of each of these substances mention one domestic purpose for which it is used and explain its action.

8. Describe with the aid of a diagram how you would prepare and collect carbon dioxide in the laboratory. How would you show (a) that the gas is heavier than air, (b) that it contains carbon, (c) that it is present in the atmosphere?

9. Draw a diagram to show the position, shape and relative sizes of the following organs of the human body: (a) the heart, (b) the liver, (c) the spleen.

Give a brief account of the functions of each of them.

10. What, in your opinion, are the characteristics of suitable hygienic clothing for (a) winter, (b) summer? Explain the importance of the characteristics you mention.

Explain why two layers of clothing are warmer than one layer of the same material and of the same weight as the two layers, and describe a laboratory experiment in support of your explanation.