

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1957.

SCIENCE (Syllabus B).

WEDNESDAY, 12th JUNE.—EVENING, 3 TO 5.30.

[Not more than *six* questions are to be attempted. *Two* questions, at least, must be answered from each Section. Illustrate your answers wherever possible.]

SECTION I.

1. Describe, with the aid of a diagram, how you would construct a mercury barometer. Explain the precautions you would take in constructing it, and show how you would use it to measure the pressure of the atmosphere.

When the pressure of the atmosphere is 29 inches of mercury, what is the greatest depth, in feet, from which an ordinary water pump could draw water? [Specific gravity of mercury is 13.6.]

[66 marks.]

2. Describe, with the aid of a diagram, how you would prepare dry hydrogen, how you would burn it in the air and how you would collect the product of combustion.

What information may be obtained from this experiment regarding the composition of the product of combustion?

[66 marks.]

3. What are the characteristic properties of acids and alkalis? Name an acid and an alkali and explain how you would use them to prepare a reasonably pure sample of a salt.

Write a brief note on the importance of salts in plant life.

[66 marks.]

4. Describe how you would show by experiment in the laboratory (a) that water is a bad conductor of heat, (b) that ordinary water contains dissolved gas, (c) that water expands whilst freezing, (d) that a black surface radiates heat better than a white one.

[67 marks.]

5. Define :—(a) lever, (b) centre of gravity, (c) fulcrum.

Describe an experiment to demonstrate the principle on which the operation of a lever depends.

A lever, suspended freely at its centre of gravity and having two objects attached to it at points which are, respectively, 10 cm. and 15 cm. from its centre of gravity, is in equilibrium. Which of the two objects is the heavier and what is the ratio between their masses?

If the lighter object is moved 2 cm. nearer to the centre of gravity, how far must the other one be moved so that the lever may remain in equilibrium?

[67 marks.]

SECTION II.

6. What is a seed?

Describe, with the aid of a sketch, the chief features of the broad-bean seed.

Give an account of how you would (i) measure the percentage germination of a sample of seed, (ii) show that germinating seeds remove oxygen from the air.

[66 marks.]

7. Describe, with the aid of sketches, the general structure of (a) the lungs, (b) the walls of the chest.

Explain how air enters the lungs and how it is expelled from them. Describe a laboratory experiment in support of your explanation.

[66 marks.]

8. Give an account of four different ways in which plants multiply vegetatively. In each case, name a plant which multiplies in that way, describe how the multiplication takes place and sketch the plant part involved.

[66 marks.]

9. Describe, with the aid of a sketch, the shape and general structure of the stomach.

Give an account of the physical and chemical changes which food undergoes in the stomach and explain how these changes are brought about.

Describe how you would investigate in the laboratory the digestive action of the gastric juices.

[67 marks.]

10. Sketch a leaf of a named dicotyledonous plant and give an account of its general structure.

Name two substances which leave a plant through the leaves and in the case of each, describe an experiment in support of your answer.

[67 marks.]