

# AN ROINN OIDEACHAIS

(Department of Education).

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INTERMEDIATE CERTIFICATE EXAMINATION, 1954.

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## SCIENCE (Syllabus D).

WEDNESDAY, 16th JUNE.—EVENING, 3 TO 5.

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[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.]

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### SECTION I.

1. Describe, with the aid of a diagram, how you would (*a*) set up a spiral spring, (*b*) measure the extensions produced by various loads suspended from it, (*c*) investigate the relationship between load and extension. What is the relationship and how is it applied in the construction of a certain type of balance?

[66 marks.]

2. State the law of flotation and describe an experiment to demonstrate it.

Describe, with the aid of a diagram, a hydrometer and tell how you would use it to measure the density of a liquid.

Explain why a rotten egg floats in water while a fresh one sinks.

[66 marks.]

3. Describe, with the aid of diagrams, how a centigrade thermometer may be constructed and explain how it works.

A centigrade thermometer and a clinical thermometer are put into a cup of tea. If the centigrade thermometer registers  $40^{\circ}$ , what will the clinical thermometer register? Explain what would happen if boiling water were used to sterilize a clinical thermometer.

[66 marks.]

4. Explain what is meant by (*a*) convection of heat, (*b*) radiation of heat, and in each case describe a laboratory experiment to illustrate your explanation.

Describe and explain (*a*) the changes which take place in the air of a room as a result of the presence of people in it, (*b*) how a fire in an open grate heats a room and how it assists in ventilating it.

[67 marks.]

5. Describe how you would demonstrate the effect of changes of pressure on the boiling point of water.

Explain (i) the difficulty of making good tea on the top of a high mountain, (ii) why tea made with water which has been boiling for some time is not palatable.

[67 marks.]

## SECTION II.

6. What are the chief characteristics of acids and alkalies ?

Describe the properties of sulphuric acid and caustic soda.

Explain the action of sour milk and baking soda in the making of soda bread. Name any other substance which could be used for that purpose instead of sour milk and explain its action.

[66 marks.]

7. In certain districts in Ireland a hard crust forms on the inside of a kettle when it has been in use for some time. Give an account of this crust under the following headings: (a) its composition, (b) its origin, (c) how it is formed in the kettle, (d) the inconvenience which it causes, (e) how it may be removed without damaging the kettle.

[66 marks.]

8. Describe an experiment to show that iron in rusting removes something from the air. Name the substance removed and give an account of its properties. Describe the changes which iron undergoes in rusting.

Explain the precautions which should be taken to prevent rusting, when iron tools which are seldom used are being put by.

[66 marks.]

9. Give an account, with the aid of a simple diagram, of the blood circulation in the human body and refer to the changes which the blood undergoes during circulation.

Explain why (a) the rate of circulation of the blood and (b) the rate of breathing increase during strenuous bodily exercise.

[67 marks.]

10. Describe the nervous and muscular actions which enable a person to move his head backwards and forwards. Explain, with the aid of a diagram showing the fulcrum and the directions of the forces, how the principle of the lever is applied in that movement.

Explain, giving one example, how a reflex action occurs.

[67 marks.]