AN ROINN OIDEACHAIS

(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS
(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1929.

SCIENCE (Syllabus A).

WEDNESDAY, 19th *JUNE.*—Morning, 10 a.m. to 12 noon.

Six questions may be attempted.

1. What do you understand by density? Describe how you would find the density of (a) a glass stopper, (b) a cork.

35 marks.

2. Describe the different ways in which heat is transmitted Describe an experiment to illustrate each method.

35 marks.

3. What changes occur when Zinc is dissolved in dilute Sulphuric Acid? Sketch the apparatus you would use to burn in air the gas evolved and to collect the product of combustion. Name the product. Describe two simple tests to verify your answer.

35 marks.

4. What is meant by the moment of a force about a point?

Make a sketch of a uniform metre scale suspended at a point 40 c.m. from one end. If its weight is 90 grm. mark on your sketch the point at which a weight of 80 grm. should be placed to keep the scale horizontal. State the distance of this point from the point of suspension of the scale.

35 marks.

5. Describe the measurements you would make in finding the volumes of the following objects :—(a) a half-metre scale, (b) the glass in a piece of tubing about 1 cm. bore and 5 cm. long ; (c) a piece of wire about 100 cm. long.

50 marks.

6. What is meant by " Normal Temperature and Pressure "? Describe an experiment to determine the expansion of 1 cc. of air when heated through 1°C. at constant pressure.

The following observations were made of the length of a column of air enclosed in a capillary tube at constant pressure :—

Temperature	77°C.	27°C.	—73°C.
Length of air column	14 cm.	12 cm.	8 cm.

Plot these results and state any conclusions you can draw from the graph.

50 marks.

7. What elements are contained in Calcium Carbonate? Describe experiments you would perform to prepare a small sample of Calcium Carbonate from its elements.

50 marks.

8. Explain how you would find, by the triangle of forces, the weight of an object using a single known weight.

What is a couple? Give examples, and state how the magnitude of a couple is measured.

50 marks.

9. State Boyle's Law.

Assuming the pressure of the atmosphere to be 75 cm. of mercury indicate in three sketches how a constant quantity of air can be placed under a pressure of (a) $1\frac{1}{2}$ atmospheres, (b) 1 atmosphere, (c) $\frac{1}{2}$ atmosphere respectively.

A barometer tube filled to within 10 cm. of an end is closed by the finger and inverted in mercury. The enclosed air expands to three times its original volume when the finger is removed. How high will the surface of the mercury inside the tube be above the level in the trough? Barometric height $= 75$ cm.

50 marks.

10. Describe the experimental determination of the Latent Heat of Steam pointing out the main precautions necessary to secure accuracy.

On passing 10 grm. of steam into 300 grm. of water at 16°C. the temperature rises to 36°C. Find the Latent Heat of Steam.

50 marks.

11. Describe in detail how you would find the weight of magnesium which would (a) unite with 1 grm. of oxygen, (b) displace 1 grm. of hydrogen from an acid.

It is found that in (a) the result is 1·5 grm. of magnesium, and in (b) 12 grm. of magnesium. Deduce the weight of oxygen that would unite with 1 grm. of hydrogen.

50 marks.

12. A body weighing 20 lbs. rests on a rough inclined plane 10′ long and 6′ high. It is found that a force of 15·2 lb. is required to keep the body moving up the plane, while a force of 8·8 lb. is required to keep it from sliding down.

Calculate (a) the work done in pulling the body up the plane.

(b) the force of friction.

(c) the work done in overcoming friction.

(d) the work done in lifting the body through the height of the plane.

50 marks.