

# AN ROINN OIDEACHAIS

(Department of Education).

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INTERMEDIATE CERTIFICATE EXAMINATION, 1952.

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## SCIENCE (Syllabus A).

WEDNESDAY, 18th JUNE.—EVENING, 3 TO 5.

[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.]

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### SECTION I.

1. Describe how you would measure accurately (a) the volume of a glass stopper, (b) the capacity of a density bottle, (c) the density of a liquid.

[66 marks.]

2. Explain why mercury is the liquid mostly used in thermometers. If you were given an ungraduated thermometer, describe with the aid of diagrams how you would graduate it to measure temperature on the Fahrenheit scale. What reading on the Centigrade scale corresponds to 20° F. ?

[66 marks.]

3. Describe fully how you would measure the specific heat of copper. A calorimeter contains 50 gm. of a liquid of specific heat 0.6. When 50 gm. of water at 50° C. are mixed with the liquid in the calorimeter, the temperature is raised from 15° C. to 25° C. Calculate the water equivalent of the calorimeter.

[66 marks.]

4. What is a calorie ?

What is meant by saying that the values for the latent heat of steam and the latent heat of ice are 540 calories per gram., and 80 calories per gram, respectively ?

Describe fully, with the aid of a diagram, how you would measure the latent heat of steam.

A vessel, having a water equivalent of 10 gms., contains a mixture of 100 gms. of water and 50 gms. of ice at 0° C. What weight of steam at 100° C. must be passed into the mixture to raise the temperature to 20° C. ?

[67 marks.]

5. Describe, with the aid of a diagram, a micrometer screw. Explain how it works and how you would use it to measure the diameter of a wire as accurately as possible.

A wire has an average diameter of 0.52 mm. and a coil of it weighs 50.50 gms. in air and 43.20 gms. in water. Find, to the nearest metre, the length of wire in the coil.

[67 marks.]

## SECTION II.

6. Describe how you would investigate the changes which take place in the composition of the air when (a) phosphorus burns, (b) iron rusts, in an enclosed volume of it.

How do you explain the observed changes ?

[66 marks.]

7. Describe, with the aid of a diagram, how you would prepare dry hydrogen and how you would pass it over heated copper oxide. What products would be obtained and how would you identify them? What information may be obtained from this experiment ?

[66 marks.]

8. Define (a) element, (b) compound.

Name the elements present in each of the following substances and describe how you would prepare each of them from its elements : sulphur dioxide, quick-lime, chalk.

Give an account of the properties of sulphur dioxide.

[66 marks.]

9. Describe fully how you would measure the weight of a litre of carbon dioxide at S.T.P.

If a litre of carbon dioxide weighs 1.98 gm. at S.T.P., find the weight of a litre at 40°C. and at a pressure of 600 mm. of mercury.

[67 marks.]

10. What is meant by allotropy ?

Describe the preparation and properties of the three common allotropes of sulphur. How may it be shown that they are allotropes ?

[67 marks.]