AN ROINN OIDEACHAIS.

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1958.

SCIENCE (Syllabus E).

TUESDAY, 17*th JUNE*.—EVENING, 3 TO 5.30.

[Not more than *six* questions to be attempted. Illustrate your answers wherever possible.]

1. What is meant by (i) force, (ii) mass, (iii) weight ?

A metre-stick is in equilibrium when suspended from the 50 cm. mark. When a glass stopper is suspended from the 27 cm. mark and a 10 gm. weight from the 80 cm. mark, the metre-stick is still in equilibrium. Calculate the mass of the stopper.

How may the mass of the metre-stick be found with the aid of a 10 gm. weight ?

[66 marks.]

2. Describe any three experiments which show that the atmosphere exerts pressure.

Name and describe an apparatus which is used for measuring the pressure of the atmosphere.

Write a note on the use of observations of atmospheric pressure in preparing weather forecasts.

[66 marks.]

3. Describe a density bottle and explain how it is used to measure the density of a given liquid.

Give an account of how the density of ice may be measured.

Calculate the fraction of an iceberg visible above the surface of the sea. (Assume that ice has a density of 0·918 and sea-water a density of 1·025.)

[66 marks.]

4. Describe experiments, one in each case, to show (i) that water expands on freezing, (ii) that ice absorbs heat on melting, (iii) that glass is a poor conductor of heat compared with copper, (iv) the cooling effect of evaporation, (v) that water is a poor conductor of heat, (vi) that a black surface radiates heat more rapidly than a white one.

[66 marks.]

5. Describe the advantages of mercury as a thermometric fluid.

Give an account of how a mercury thermometer may be constructed and describe how it may be graduated to read from −5°C. to 110°C.

Describe a thermometer which may be used to measure very low temperatures.

[66 marks.]

6. Write the laws of refraction of light.

What is meant by index of refraction?

Describe how the index of refraction (i) of glass, (ii) of water, may be found.

Describe and explain two everyday examples of the refraction of light.

[66 marks].

7. Explain, with the aid of a diagram, how different musical notes are produced on a wind, or on a stringed, instrument.

Describe an experiment for measuring the velocity of sound in air.

What is the effect of increased temperature on the velocity of sound in air?

[67 marks.]

8. Give an account of the earth's magnetism.

State what is meant by (i) dip, (ii) declination, and describe how each is measured.

Describe how a simple electromagnet may be constructed. Mention any use of an electromagnet.

[67 marks.]

9. Describe, with the aid of a clearly-labelled diagram any cell which produces electricity and describe the reactions which take place within the cell when current is being drawn from it.

Show how the cell may be used to drive a small electric motor. Draw a diagram to show the most important parts of the motor and explain how the motor works.

[67 marks.]

10. Describe each of the following and explain how it works :— (i) an electric light bulb, (ii) an electric kettle. Refer in your answer to conductors and non-conductors of electricity. In the case of the electric bulb explain how the heat is dissipated.

Give an account of an electric fuse, state its function and explain how it works.

[67 marks.]