AN ROINN OIDEACHAIS.

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1957.

SCIENCE (Syllabus E).

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

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

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1. What is a lever ?

What is meant by (*a*) fulcrum, (*b*) centre of gravity ?

Give an example of each of the three classes of levers. In each case the position of the fulcrum and the direction of the forces acting should be clearly shown in a diagram.

Show how the weight of a given glass stopper could be found using only a metre-stick of known weight, a stand and a few pieces of thread.

[66 marks.]

2. Describe, with the aid of a sketch of the apparatus, (*a*) an experiment to show that water has its maximum density at 4°C., (*b*) an experiment to show that water expands on freezing.

Describe the properties of ice and explain why ponds rarely freeze to the bottom.

[66 marks.]

3. Show how you would demonstrate convection currents in air.

Describe and explain the planetary winds.

Describe an instrument for measuring rainfall and explain how it is used.

Explain why in Ireland the average rainfall is greater in the west than in the east.

[66 marks.]

4. Give a simple explanation of how thunder and lightning occur.

Explain why there is generally a lapse of some seconds between the flash of lightning and the peal of thunder.

Describe a lightning conductor and explain how it works.

What precautions can a person take (*a*) indoors, (*b*) outdoors, during a thunderstorm ?

[66 marks.]

5. Distinguish between conduction and radiation of heat. Give one example of each of these phenomena from everyday life.

Describe a simple experiment to show (i) that copper is a better conductor of heat than iron, (ii) that water is a poor conductor of heat, (iii) that a blackened surface absorbs heat more readily than a bright surface.

Give a brief account of the thermos flask.

[66 marks.]

6. Give an everyday example of (*a*) reflection of light, (*b*) refraction of light.

State the laws of reflection of light and describe an experiment to illustrate one of them.

Draw a diagram to show how a ray of light is refracted in passing through a rectangular block of glass.

[66 marks.]

7. Describe how it may be demonstrated that sound cannot be propagated through a vacuum.

Does sound travel faster through water than through air ? Outline an experiment which might be carried out to support your answer.

Explain how a knowledge of the velocity of sound in water may be used to find the depth of the sea.

[67 marks.]

8. What is a magnet ?

Describe a method of magnetising a piece of steel (*a*) by using a bar-magnet, (*b*) by using an electric current.

A magnetised steel needle is suspended at its centre of gravity so as to be free to rotate horizontally and vertically. Describe the position it will occupy when it comes to rest and give reasons for your answer.

Draw a diagram of a simple form of ship's compass and explain how it works. Mention any factors which might affect the accuracy of this instrument.

[67 marks.]

9. How may it be shown that when a glass rod is rubbed with silk (i) both the rod and the silk acquire charges of electricity, and that these charges are of opposite sign to each other, (ii) that the charge produced on the glass rod is of opposite sign to the charge produced on an ebonite rod rubbed with fur ?

How may it be shown that like charges repel each other ?

Give an account of any form of machine which produces electricity by friction.

[67 marks.]

10. Describe a simple transformer and explain the principle on which it is based.

Describe how electricity is transmitted from the generating stations in Ireland to the places where it is required.

How may direct current be obtained from a dynamo ?

For some purposes direct current only is suitable. Describe any two examples of this.

[67 marks.]