

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1952.

SCIENCE (Syllabus E).

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

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

1. Explain how each of the following occurs : winds, hail, dew, clouds, white frost.

Explain also, (a) why the atmosphere feels warmer after a downpour of rain, (b) why fog forms on the sea in the neighbourhood of ice-bergs, (c) why dew is not always deposited to the same extent on different surfaces.

[66 marks.]

2. Describe fully how a mercury barometer is constructed and how it is used to measure the pressure of the atmosphere.

Explain how the reading of a barometer would change if it were (a) brought up in an aeroplane, (b) immersed in water, (c) brought down into a mine.

[66 marks.]

3. Define : (a) force, (b) mass, (c) weight.

A piece of iron is suspended in water by means of a thread. Mention the forces acting on the piece of iron and show on a diagram the direction in which each of them acts.

Describe fully how the magnitudes of these forces may be found and show how they may be used to calculate the density of iron.

[66 marks.]

4. Show, with the aid of a diagram, how a plane mirror forms an image and describe the kind of image which it forms.

Prove that an object and its image are equidistant from a plane mirror.

Describe a device which enables an observer in a submerged submarine to see objects on the surface of the sea and explain with the aid of a diagram how it works.

[66 marks.]

5. What is a magnetic substance ?

Give an account of the properties of a bar-magnet.

Describe, with the aid of a diagram, the mariner's magnetic compass and explain how it is used in navigation.

Explain the precautions which must be taken to ensure that it will work accurately in an iron ship.

[66 marks.]

6. Describe any kind of electric cell and give an account of the changes which take place in it when current is being drawn from it.

If you were given three cells, each having an electromotive force of 2 volts, show by means of a diagram how you would connect them so as to form a battery having an electromotive force of 6 volts.

Describe any other method of connecting the cells and state the electromotive force of the battery formed.

[66 marks.]

7. What is meant by electric induction ?

Describe (a) two different experiments to demonstrate electric induction, (b) two different experiments by means of which the direction of an electric current in a wire might be ascertained.

Describe briefly the working of an alternating current dynamo.

[67 marks.]

8. Describe with the aid of diagrams how a Fahrenheit thermometer is constructed and graduated, and explain how it works.

Find at what temperature a Fahrenheit thermometer and a Centigrade thermometer will show the same reading.

[67 marks.]

9. Describe, with the aid of a diagram, an experiment to show (a) that sound will not travel through a vacuum, (b) that wood is a better conductor of sound than air, (c) that sound can be reflected in the same way as light is reflected.

A person, standing at a certain distance from a high wall, emits a whistle and notices that there is an interval of two seconds between the whistle and its echo. On walking 280 feet nearer the wall, he notices that the interval between the whistle and its echo is 1.5 secs. Calculate (a) the speed of sound, (b) the distance the person was from the wall in the first instance.

[67 marks.]

10. Show, with the aid of a diagram, the electric circuit of an ordinary house in which several electric lamps, several electric fires and an electric cooker are used.

A current of 5 amps. passes through an electric fire joined to a 220 volt circuit. Find the cost, at 5d. per unit, of the electricity required to keep the fire working for 10 hours.

[67 marks.]