

AN ROINN OIDEACHAIS

(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1946.

SCIENCE (Syllabus E).

WEDNESDAY, 19th JUNE.—MORNING, 10 TO 12.

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

1. What are the characteristic properties of gases ?

Of what gases is the atmosphere composed, and in what relative proportions are the two principal gases present ?

Mention and explain two everyday examples which show that the atmosphere exerts a pressure.

2. Explain with the aid of diagrams how the cardinal points could be found (a) on a sunny day, (b) on a clear night.

Explain with the aid of diagrams (i) why the amount of daylight varies in this country from day to day in the course of a year, (ii) why the stars in the southern sky appear to move from east to west during the night, (iii) why the stars rise a little earlier every night.

3. A glass vessel contains some water, pieces of ice and a few grains of sawdust. A thermometer is placed in the vessel and the contents are gradually heated over a Bunsen burner until the water boils. Describe and explain the various phenomena which would be noticed during the heating.

4. Describe laboratory experiments to show (a) that gases expand much more than liquids when the temperature is raised, (b) how convection currents are caused in the air.

Explain how "land and sea breezes" occur.

5. Explain fully with the aid of diagrams how the image of an object is formed (a) in the pin-hole camera, (b) in an ordinary camera.

In what way would the image be affected in each case (i) by moving the object nearer the camera, (ii) by increasing the size of the aperture ? Explain your answers using diagrams.

6. Explain the cause of each of the following :—

- (a) the blue colour of the sky,
- (b) the sun generally appears redder at sunset and at sunrise than at mid-day,
- (c) the image in a plane mirror is different from the object in some respects,
- (d) the apparent altitude of a star near the horizon is greater than its true altitude,
- (e) twilight.

7. Describe any method for measuring the speed of sound in air.

What is the approximate speed of sound in (a) air, (b) water ?

Describe fully how a knowledge of these speeds might be used to measure (a) the distance of a ship from a high cliff, (b) the depth of the sea.

8. Describe how you would make a permanent magnet having (a) a north pole at one end and a south pole at the other, (b) a south pole at each end.

Explain why a magnet will pick up small pieces of iron but will not pick up small pieces of copper. Explain, also, why a bar magnet having unlike poles at its ends sets in a definite direction when suspended so that it is free to turn in a horizontal plane.

Will a bar magnet suspended horizontally as described above always point in the same geographical direction (i) if kept in the same place, (ii) if moved round the earth parallel to the equator ? Explain your answers.

9. Explain how electricity is produced in this country at Ardacrusha and how it is transmitted thence to ordinary dwelling houses throughout the country.

10. Describe with the aid of diagrams and explain the working of (a) an ordinary household electric switch, (b) an electric fuse of any kind, (c) an electric lamp, (d) an electric kettle.

Explain why a fuse used in a circuit supplying electric lamps would not generally be suitable for a circuit supplying an electric cooker.