AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1949.

PHYSICS.—PASS.

SATURDAY, 11*th JUNE*.—MORNING, 10 TO 12.

Not more than *two* questions may be answered from each Section.

All questions are of equal value.

SECTION I.

1. State the Principle of Archimedes and tell how you would test it experimentally in the case of a given liquid.

The specific gravity of ice is 0·9 and that of sea water is 1·025. Calculate the percentage of the volume of an iceberg that will appear above the surface of the sea.

2. What do you understand by the following :—(*a*) force, (*b*) momentum, (*c*) kinetic energy?

A horizontal force of 1 gram weight acts on a body of mass 100 grams which was at rest on a smooth horizontal plane. Calculate (i) the velocity of the body, (ii) its momentum, (iii) its kinetic energy, after 2 minutes.

$$[\text{`` } g \text{ ''} = 981 \text{ cms./sec.}^2]$$

3. State the theorem known as the parallelogram of forces and describe an experiment to verify it.

Two forces of 10 lbs. weight and 15 lbs. weight make an angle of 60° with one another. Find the magnitude of their resultant and the angle it makes with the greater force.

4. A mass of 264 lbs. takes 5 seconds to slide from rest down a smooth plane inclined at an angle of 30° to the horizontal. What horse-power would be required to pull the mass back up the plane to its original position in 2 minutes?

SECTION II.

5. Define " latent heat of steam " and describe how you would measure it by experiment. Mention the principal causes of inaccuracy in the experiment.

6. State Boyle's Law and describe how you would demonstrate the truth of the law experimentally.

A mass of air is enclosed by means of a thread of mercury 3 cms. long in a narrow glass tube of uniform bore sealed at one end. When the tube is held vertically with the open end uppermost, the column of air is 12 cms. long and when it is held vertically with its closed end uppermost, the length of the column of air is 13 cms. Calculate the atmospheric pressure.

7. State the laws of reflection of light and describe how you would demonstrate the truth of one of these laws experimentally.

An object is placed 40 cms. in front of a concave mirror whose focal length is 10 cms. Calculate the position of the image. Show, by means of a diagram, how the image is formed and state its nature.

8. Describe how the focal length of a convex lens may be determined by experiment.

Show by means of a diagram how a convex lens may be used as a magnifying glass.

Section III.

9. State the properties of a magnet. Describe two different ways in which a piece of iron may be magnetised. What do you understand by magnetic declination? Describe fully how it may be measured at a given place.

10. Describe the gold leaf electroscope. Describe what happens when

    (i) a negatively charged rod is held near the cap of a gold leaf electroscope,

    (ii) the finger is placed on the cap of the electroscope, the rod being still in position,

    (iii) the finger and subsequently the rod are taken away.

Illustrate your answer by means of diagrams and indicate in each case the nature and distribution of the charge.

11. Describe briefly experiments, one in each case, to show

    (i) that an electric current produces a magnetic field,

    (ii) that heat is produced in a wire when an electric current passes through it,

    (iii) that water may be broken up into its elements by means of an electric current.

12. Describe the potentiometer and explain how you would use it to compare the electromotive forces of two cells.