AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1948.

PHYSICS.—PASS.

SATURDAY, 19*th JUNE*.—MORNING, 10 TO 12.

Candidates must answer one question at least out of each Section and not more than *six* questions in all.

All questions are of equal value.

SECTION I.

1. State Archimedes' Principle. Explain how it would apply to the case of a body floating in water. Explain carefully how you would determine the density of a body which floats in water.

2. Explain fully how you would use a simple pendulum to measure the acceleration of gravity, stating the precautions you would take to ensure a reasonably accurate result. Give a list of the principal sources of inaccuracy.

3. State the theorem of the 'triangle of forces.' State, also, the converse of this theorem. Explain how you verify *either* the theorem *or* its converse by experiment.

4. Define work and power, giving C.G.S. units in terms of which these quantities may be measured. A shot weighing 100 lbs. moving with velocity 1000 feet per second is brought to rest (*a*) in $\frac{1}{2}$ second, (*b*) in 30 feet : find the average force required in each case.

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Section II.

5. Define latent heat of fusion of ice. How would you determine its value by experiment ? Mention the principal sources of inaccuracy.

6. Explain the meaning of ' mechanical equivalent of heat.' Describe how you would obtain a value for the mechanical equivalent of heat by experiment, pointing out the precautions necessary to obtain an accurate value.

7. Show by means of a diagram how a convex lens may form a virtual image. Explain how you would measure the focal length of a convex lens using a virtual image.

8. State the laws of reflection and refraction of light. Explain how you would determine the index of refraction of water by locating the apparent position of an object which lies at the bottom of a vessel containing a known depth of water. Draw a diagram to illustrate the path of the rays of light from the object.

Section III.

9. Two bar magnets A and B of negligible length are placed horizontally in the magnetic meridian. The N-pole of A and the S-pole of B point North. At a certain point P lying between them and on the straight line which coincides with their axes, the value of the magnetic field is that of the horizontal component of the earth's magnetic field at that point. The point P is 50 cms. from the centre of A and 100 cms. from the centre of B. Calculate the ratio of the magnetic moments of A and B.

10. State Ohm's Law. Explain fully how you would use a tangent galvanometer, known resistances and a cell to investigate the relationship between current and resistance.

11. Describe the gold-leaf electroscope. Explain carefully how you would charge it by induction. It being taken that the instrument has been charged by induction using a negatively charged rod, explain what would happen if a positively charged conductor were brought up to the electroscope.

12. Describe the construction of an electromagnet. Explain fully the working of any piece of electrical mechanism of which an electromagnet forms part.