

AN ROINN OIDEACHAIS.

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1957.

PHYSICS.—PASS.

SATURDAY, 15th JUNE.—MORNING, 10 TO 12.30.

Not more than six questions to be answered.

One question, at least, must be answered from each section.

SECTION I.

1. Define *density*, and distinguish between *density* and *specific gravity*.

Describe an experiment to measure the specific gravity of a piece of light wood.

A piece of metal floats in mercury, specific gravity 13.6, with five-ninths of its volume submerged. Calculate the specific gravity of the metal.

[66 marks.]

2. State the principle of moments and describe an experiment to demonstrate it.

A uniform rod AB weighing 2 lb. and 6 feet in length can turn freely about a point which is one foot from A. What is the magnitude and direction of the least force applied (i) at A, (ii) at B, (iii) at the middle point of AB, that will keep the rod in equilibrium in a horizontal position?

[66 marks.]

3. A body of mass 100 lb. slides from rest down a smooth plane inclined at an angle of 30° to the horizontal. What is the kinetic energy of the body, in foot-pounds, after it has been in motion for 2 seconds, and how far down the plane does it move in that time?

Find, in horse-power, the rate at which work is being done when the body is dragged from rest a distance of 20 feet up the plane in 4 seconds.

[67 marks.]

SECTION II.

4. State the laws of reflection of light at a plane surface and describe an experiment to verify one of them.

Describe and explain, with the aid of a diagram, how a suitable glass prism may be employed to turn a ray of light (a) through an angle of 90° , (b) through an angle of 180° .

[66 marks.]

5. Describe a simple form of compound microscope and indicate by means of a diagram how the eye, on looking through the microscope, sees the final image. Describe, also, a method of measuring the refractive index of a transparent liquid using a microscope.

[66 marks.]

6. Distinguish between the terms 'deviation' and 'dispersion' as applied to a beam of light.

Describe, with the aid of a diagram, an instrument or a laboratory arrangement for viewing the spectrum of sunlight and show by means of a diagram how the spectrum is obtained.

Describe briefly the appearance of this spectrum.

[67 marks.]

SECTION III.

7. Name and define (a) a unit of work, (b) a unit of heat, in the C.G.S. system.

What is understood by the mechanical equivalent of heat? Describe one method of measuring the mechanical equivalent of heat.

[66 marks.]

8. Describe, with the aid of a diagram, an experiment—

(a) to investigate the volume composition of water using an electric current;

(b) to electroplate a sheet of copper with silver.

What result would you expect in the case of (a)?

[66 marks.]

9. What is understood by each of the following:

magnetic moment of a bar-magnet, magnetic meridian, null point?

A bar-magnet lies along the magnetic meridian with its south-seeking pole pointing northwards. Describe, with the aid of a diagram, the resultant magnetic field in the neighbourhood of the bar-magnet. Knowing the horizontal component of the earth's magnetic field, explain how the magnetic moment of the bar-magnet may be found.

[67 marks.]

10. Define (i) ampere, (ii) ohm.

Describe a method of measuring the electrical resistance of a piece of wire of about 20 ohms resistance.

The resistances of two pieces of wire are 10 ohms and 15 ohms, respectively. Find the effective resistance in each of the following cases (a) when the wires are joined in series, (b) when the wires are joined in parallel.

[67 marks.]