

AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1951.

PHYSICS.—PASS.

THURSDAY, 14th JUNE.—EVENING, 4 TO 6.

Not more than six questions to be answered.

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

All questions are of equal value.

SECTION I.

1. A stone is dropped from the top of a tower, and one second later another stone is dropped from a point which is 48 feet lower down. If both stones reach the ground at the same instant find the height of the tower.

2. Define : work, power.

A man weighing 143 lbs. climbs a vertical ladder at uniform speed to a point 40 feet above the ground. If he works at the rate of a quarter of a horse power, how long does it take him to reach that point?

[1 H.P.=550 ft. lbs. per second.]

3. State Boyle's law and Charles' law, and describe fully how you would test one of them by experiment.

If the density of hydrogen at N.T.P. is 0.09 gram per litre, find, approximately, its density at 27°C. and 740 mm. pressure.

SECTION II.

4. Describe how the focal length of a convex lens may be found by experiment.

A pin stands vertically on the axis of a convex lens at a point which is further away from the lens than the focus. State the nature of the image and show by means of a diagram how it is formed by the lens.

5. State the laws of reflection of light at a plane surface.

(a) Prove that the image formed in a plane mirror is as far behind the mirror as the object is in front of it.

(b) If a plane mirror is rotated through an angle α , the incident ray remaining fixed, prove that the reflected ray will be rotated through an angle 2α .

6. What is a pure spectrum?

What conditions are necessary to obtain a reasonably pure spectrum?

Show by means of a diagram an arrangement for producing a pure spectrum of white light, and explain how the necessary conditions are fulfilled.

SECTION III.

7. Define (i) magnetic meridian, (ii) magnetic moment of a bar magnet.

A bar magnet 18 cms. long lies horizontally with its south pole pointing North and its axis in the magnetic meridian. A neutral point is found to lie in the direction of the axis at a distance of 30 cms. from the centre of the magnet. If the strength of the horizontal component of the earth's magnetic field is 0.18 gauss, calculate the magnetic moment of the magnet.

8. Describe a gold-leaf electroscope.

A metal can is placed on an insulating stand and connected to the cap of a gold-leaf electroscope by means of a wire. A positively charged conductor suspended by a silk thread is lowered into the can, but does not touch the sides of the can. Indicate by means of a diagram the nature and distribution of the charges on the can and electroscope.

If the charged conductor is allowed to touch the inner surface of the can and is then removed, how will the charges be affected?

9. Describe in detail, an experiment to investigate what happens when an electric current is passed through acidulated water.

What is to be learned from this experiment?

10. Describe a simple form of dynamo and explain the principle of its operation.