AN ROINN OIDEACHAIS
(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1940.

PASS.

PHYSICS.

FRIDAY, 21st JUNE.—AFTERNOON, 1.30 TO 3.30 P.M.

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. Draw diagrams to show how (*a*) a real diminished image, (*b*) a real enlarged image, (*c*) a virtual image can be formed by use of a concave mirror.

An object, of height 4 cms., is 10 cms. distant from a concave mirror of 20 cms. focal length. Find the position, nature and size of the image.

2. State the laws of refraction of light. What is meant by the critical angle? Show how you would find the index of refraction of the glass of a given glass cube.

3. Give an account of a method by which the velocity of light has been determined.

4. What essentials are necessary for the formation of a pure spectrum on a screen. Illustrate by a diagram, the path of a beam of light through the system.

Write a short account of the rainbow and state how it occurs.

Section II.

5. Explain the term acceleration. Describe a method for determining the acceleration due to gravity.

6. A body moving with uniform acceleration f and whose initial velocity is u traverses the space s in time t. Show that $s = ut + \frac{1}{2}ft^2$ gives the distance traversed by the body.

A body is allowed to fall from the top of a tower and strikes the ground after 5 secs. Find the height of the tower.

[$g = 32$ ft./sec./sec.]

7. Define : force ; work ; power. A cyclist and his machine weigh 180 lbs. At what horse-power must he work in order to ascend a slope of 1 in 30 at 5 miles per hour if it is assumed that the resistance (in addition to that due to the weight of rider and machine) is equivalent to a force of 4 lbs. acting parallel to the slope ?

8. What is " energy " ? What is known as the principle of the conservation of energy ?

Describe a method for finding the mechanical equivalent of heat.

Section III.

9. Explain the presence of neutral points near a bar magnet.

Indicate the resultant field and the positions in which you would expect to find the neutral points when the North Pole of the magnet, lying in a horizontal plane, is made to point (a) North, (b) South.

10. Describe the gold-leaf electroscope and explain what is observed when a conductor (a) positively charged, (b) negatively charged, (c) earthed is brought near a positively charged electroscope.

11. What is an electromagnet ?

Explain fully, with the aid of a diagram, how an electric bell works.

12. State Ohm's Law.

You are given two pieces of wire. Describe fully how you would compare their resistances.