AN ROINN OIDEACHAIS.
(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

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LEAVING CERTIFICATE EXAMINATION, 1938.

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LOWER COURSE.

PHYSICS.

FRIDAY, 24th JUNE.—AFTERNOON, 1 P.M. TO 3 P.M.

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Not more than *six* questions may be attempted
All questions are of equal value.

1. A picture is stuck to the bottom of a cube of glass which is 1 inch in thickness. The refractive index of the glass is 1·50. How far below the top of the cube does the picture appear to be? Prove any formula you use.

2. A convex lens gives a real image 5 feet long of a picture which is 4 inches long and the image is 20 feet from the lens. How far is the picture from the lens and what is the focal length of the lens? [If algebraic signs are used, it must be explained clearly when a length is called negative.]

3. Give an account of the different kinds of spectra and the differences between them. Explain how the different kinds are obtained.

4. Give an account of a method of determining the velocity of light.

5. A boat is to be steered across a river to the nearest point on the opposite bank. The velocity of the boat is 10 miles per hour and of the stream 6 miles per hour. In what direction must the boat be steered, and how long will it take to go across if the river is one-fifth of a mile in width?

6. A light string passes over a wheel and there is a weight of 40 lbs. tied at each end of the string. A weight of one pound is placed on one of the large weights and when it has gone down 4 feet, the one-pound weight is removed. How long did it take to travel these 4 feet and how long will it take to travel a further 6 feet? Friction and the weight of the wheel may be neglected.

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

7. Explain the terms "force" and "kinetic energy" and the connection between them.

A bullet is fired from a gun with a velocity of 20,000 cms./sec. The mass of the bullet is 20 grams and the velocity is given to it in ·01 sec. Find the kinetic energy of the bullet and the mean value of the force which acted on it.

8. A north magnetic pole of strength 24 units is placed on the production of the axis of a bar-magnet. It is 10 cms. from the north pole of the magnet and 40 cms. from the south pole of the magnet., i.e., the magnet is 30 cms. long. The strength of each pole of the magnet is 200 units. What is the magnitude and direction of the force which acts on the pole of 24 units? If you use a formula, prove it.

9. Give a short account of "lines of electric force". Two points, A and B, are situated x cms. from each other on a line of force in a uniform electric field. Explain the difference and the connection, between "the strength of the field" and "the difference of potential between A and B".

10. Give an account of one of the following cells, and the chemical changes which take place in it—a storage cell, a Leclanche cell, a Daniell cell.

11. Describe one form of galvanometer and the method of measuring electric current with it. How is it used as a voltmeter?

12. Give a short account of the currents which flow in a coil of wire when a magnet is inserted into it and when it is drawn out. Explain carefully the direction of the currents and the time for which they flow. Show the way in which this effect is used in the induction coil to obtain a high electro-motive force.