AN ROINN OIDEACHAIS
(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1936.

FULL COURSE.

PHYSICS.

THURSDAY, 25th JUNE.—AFTERNOON 1.30 TO 3.30 P.M.

Not more than *six* questions may be attempted.

All questions are of equal value.

1. Explain the parallax methods used in optical experiments. Describe how you would find the focal length of (*a*) a concave mirror and (*b*) a convex mirror by parallax methods. Illustrate your answer by diagrams.

2. A convex lens casts an image equal in size to the object, which is placed 50 cms. from the lens. If another lens is placed in contact with the first, the image is increased to twice its previous linear dimensions. Find the focal lengths of the two lenses.

3. How may a convex lens and a concave lens be employed to form a telescope? Give a carefully drawn diagram of the paths of the rays by means of which an eye may observe a point of a distant object.

4. How would you determine the index of refraction of water? Give experimental details and justify any formula used.

5. What is meant by the Mechanical Equivalent of Heat? Describe fully how this quantity may be determined experimentally. State its value.

6. Two buckets each of mass 7·5 lb. are supported by a thin rope over a smooth pulley and are at rest. A mass of 1 lb. is dropped from a height of 4 feet into one of the buckets. Calculate the time which elapses after impact before the buckets have moved through a vertical distance of 10 feet.

7. A boy weighing 8 stone and riding a bicycle weighing 21 lbs. rides up a hill with a gradient of 1 in 21 at 9 miles per hour. Assuming that friction is equivalent to a force of 2 lb. wt. resisting his motion up the hill, find his rate of working in horse-power.

1 H.P.=550 foot lb. per sec.

8. Derive an expression for the intensity of the magnetic field at any point on the prolongation of the axis of a bar magnet. Explain how the expression may be used in the experimental comparison of the magnetic moments of magnets.

9. What is meant by the electrical capacity of a condenser? On what does it depend? Two Leyden jars of capacities C_1 and C_2 are connected (*a*) in parallel, (*b*) in series. Find the resultant capacity in each case.

10. Describe the construction of a moving coil galvanometer and explain its action. Explain the use of a shunt in connexion with a galvanometer.

11. A tangent galvanometer has 6 turns of wire of mean radius 10 cm. Find the mass of copper deposited in 30 minutes by a current which produces a deflexion of 45°.

E.C.E. of copper=0.000328 gm. per coulomb.
H=0.18 dyne per unit pole.

12. State the laws of electromagnetic induction. Explain the essential features of a simple form of dynamo for producing direct current.