# AN ROINN OIDEACHAIS.

(Department of Education).

**BRAINNSE AN MHEADHON-OIDEACHAIS**

(Secondary Education Branch).

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**LEAVING CERTIFICATE EXAMINATION, 1939.**

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**FULL COURSE.**

## PHYSICS.

*THURSDAY, 22nd 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.

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1. Explain the principle of parallax used in optical experiments. Describe any two experiments in which parallax methods may be used for locating images.

2. How would you determine experimentally the magnification produced by a single convex lens ? A lens forms an image 1 cm. long of a linear object. On moving the lens 20 cms. along its axis, keeping the object and screen fixed, another image 9 cms. long is formed. Find the focal length of the lens and the length of the object.

3. Describe the compound microscope and deduce an expression for its magnifying power.

4. What is meant by the angle of minimum deviation of a prism ? Establish the relation between the angle of minimum deviation, the angle of the prism and the refractive index.

5. Establish the relation $D=ut+\frac{1}{2}ft^2$, $s$ being the space passed over in time $t$, by a body moving in a straight line with uniform acceleration $f$, the initial velocity being $u$. How would you verify the formula experimentally in the case of a body starting from rest ?

6. Describe how the acceleration due to gravity may be determined by means of Atwood's machine.

7. A simple pendulum is suspended from the roof of a railway carriage and remains vertical while the train is running uniformly at 30 miles per hour. When the brakes are put on, the pendulum oscillates through an angle of 3°. Show that the train will come to rest after running a distance 385 yards, assuming the resistance is constant.

8. Give a general account of the earth's magnetism. What observations must be made to determine completely the direction of the magnetic field at any point on the earth's surface ?

9. Describe the Leyden Jar and explain its action. Calculate the capacity of a cylindrical jar of 16 cm. diameter on which the coatings extend over the bottom and rise to a height of 20 cm. on the sides. The thickness of the glass is 3 mm. and the dielectric constant 6.

10. State Ohm's Law. Given 3 cells each of E.M.F. 1·5 volts and internal resistance 1 ohm and 3 coils each of resistance 10 ohms, show how you would connect them all up so as to have (*a*) the greatest possible and (*b*) the least possible current. Calculate the value of the current in each case.

11. Describe and explain the action of some form of moving coil galvanometer. Compare its usefulness with that of a moving needle galvanometer.

12. Explain the theory of the potentiometer and describe how the potentiometer may be used (*a*) to measure the internal resistance of a cell and (*b*) to compare resistances.