

**AN ROINN OIDEACHAIS**  
(Department of Education).

**BRAINSE AN MHEÁN-OIDEACHAIS**  
(Secondary Education Branch).

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**LEAVING CERTIFICATE EXAMINATION, 1932.**

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**HONOURS.**

**PHYSICS.**

**WEDNESDAY, 8th JUNE.—AFTERNOON, 1.30 TO 3.30 P.M.**

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Not more than *six* questions may be attempted.

All questions are of equal value.

1. State and explain the adjustments which should be made in using a spectrometer. Describe the determination of the refractive index of glass relative to air by means of the spectrometer.

2. Describe with sketches and explain the action of a concave lens as applied to any optical instrument you have studied.

3. What is meant by the magnifying power of an optical instrument? Describe a method of determining the magnifying power of (a) a telescope, (b) a simple microscope.

4. Describe how to determine experimentally a high velocity such as that of a pellet from an air gun or of a bullet from a pistol.

A rifle bullet weighs an ounce and has a velocity of 2,500 feet per second. A block of iron for driving piles weighs 10 cwt. and has a velocity of 20 feet per second. Compare (a) the Kinetic Energies (b) the momenta in the two cases.

5. What is meant by Joule's Mechanical Equivalent of Heat? Show how this quantity may be experimentally determined and explain the theory of the method.

6. A straight line is drawn about midway along a curve which has been traced by a vibrating rod on a Fletcher trolley moving with uniform acceleration from rest. It is observed that two

points A. and B. of intersection of the curve and line, some distance from the starting point O of the curve are such that ten complete vibrations each of 0.1 second duration are shown between them. If the distances OA and OB are 8 cm. and 50 cm. respectively, calculate the acceleration of the trolley.

In connection with the measurement of acceleration using Fletcher's trolley discuss the advantages as regards accuracy of taking observations as above over the direct observation of distance and time from rest.

7. What is meant by specific Inductive Capacity? Describe experiments showing that different materials have different specific inductive capacities.

Explain how the following may be supposed to act as condensers: (a) a submarine cable, (b) the aerial of a wireless installation, (c) the frame of a motor or dynamo if insulated from the earth.

8. State Lenz's law of Induction. Describe two experiments in illustration of this law.

9. What is meant by the Specific Resistance of a material? Describe in detail how the specific resistance of a piece of German Silver wire may be determined.

Give two examples of electrical appliances in which the resistance of a conductor is availed of, and explain its advantage in each case.

10. Describe how to determine the internal resistance of a secondary cell.

Two cells the Electro-motive forces of which are as 3: 2 are joined up in series with their E.M.F.'s acting in the same direction, and the circuit is completed through an ammeter which then reads 2 amps. If one of the cells is reversed, no other change being made, what will the ammeter now read?