

AN ROINN OIDEACHAIS  
(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS  
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1930.

HONOURS.

PHYSICS.

FRIDAY, 20th JUNE.—AFTERNOON, 1.30 to 3.30 P.M.

Not more than *six* questions may be attempted.

All questions are of equal value.

1. Distinguish between a real and a virtual image.  
Draw diagrams to show the formation by a convex lens of  
(a) a real image, and (b) a virtual image.  
How may the position of the virtual image in (b) be determined  
experimentally?

2. Show by a diagram the path of a ray passing through a  
prism at the position of minimum deviation.  
A is the angle of a prism, D the angle of minimum deviation,  
and  $\mu$  the refractive index of the material of the prism.

$$\text{Prove } \mu = \frac{\sin \left( \frac{A+D}{2} \right)}{\sin \frac{A}{2}}$$

3. What is understood by the "critical angle"? Show that  
the sine of the critical angle is equal to the reciprocal of the  
refractive index of the substance.

Describe an experiment to determine the critical angle from  
water to air.

4. A mass of 4 kilograms on a smooth table is drawn towards  
the edge of the table by a weight of one kilogram attached to a  
string passing over the edge and hanging vertically. Calculate  
the distance described and the speed acquired after moving from  
rest for a second. Verify that the energy of the system is  
unaltered.

5. Describe, giving precautions, a method for determining the acceleration due to gravity. Justify any formulæ used in deriving the result.

6. Describe an experiment to show that no change in momentum occurs when two bodies collide.

A  $\frac{1}{2}$  oz. bullet is fired into and remains embedded in a 6 lb. mass, which is suspended by a long string. The swing of this mass is then such that it rises 10" above its original position of rest.

Indicate how the velocity of the bullet can be obtained. (The final numerical result need not be calculated.)

7. What is understood by "Electric Potential." Define the "Potential at a point."

Describe any form of condenser you have examined. On what factors does the potential difference between the plates of a condenser depend for a given charge ?

8. Describe methods to determine respectively (a) the plane in which the Earth's magnetic force acts, (b) the line in that plane along which the Earth's magnetic force acts.

9. Give an account of the effects produced when an electric current passes through an electrolyte.

Describe how the weight of copper deposited by 1 ampère in 1 second could be determined.

10. Explain, with sketch, the method of comparing the Electromotive forces of two cells by means of a potentiometer.

A galvanometer having a resistance of 40 ohms gives a deflection of 1 scale division for a current of  $\frac{1}{100}$  ampère. What resistance must be used with it so that each galvanometer division should indicate 1 ampère ?