

# AN ROINN OIDEACHAIS.

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1955.

## PHYSICS.—PASS.

SATURDAY, 18th JUNE.—MORNING 10 TO 12.

Not more than six questions to be answered.

One question, at least, must be answered from each section.

### SECTION I.

1. State the principle of moments and describe an experiment to demonstrate it.

When an object is placed in one of the scale-pans of a balance, the arms of which are of unequal length, it appears to weigh 50 gms., and when placed in the other scale-pan, it appears to weigh 54 gms. Calculate the true weight of the object. [66 marks.]

2. Define :—(a) calorie, (b) latent heat of steam.

Describe fully an experiment to measure the latent heat of steam. Mention the principal sources of error in the experiment. [66 marks.]

3. What is meant by (a) potential energy, (b) kinetic energy?

What is the relation between these quantities in the case of a body which falls freely under gravity?

A body sliding down a smooth inclined plane has a speed of 5 miles per hour at a point A on the plane. If the height of A, measured vertically, from the bottom of the plane is 100 feet, calculate the speed of the body on reaching the bottom of the plane.

[67 marks.]

### SECTION II.

4. What is meant by the refractive index of glass with respect to air?

Describe, with the aid of a diagram, (i) how you would trace by experiment the path of a ray of light which enters obliquely at one face of a rectangular block of glass and emerges from the opposite face, (ii) how you would thus measure the refractive index of glass with respect to air.

If the angle of incidence of the ray is  $30^\circ$  and if the perpendicular distance between the two faces of the glass block is 2 inches, calculate the distance the ray travels in passing through the glass, assuming that the refractive index of glass is  $\frac{3}{2}$ .

[66 marks.]

5. (a) A pin is placed vertically in front of an upright plane mirror. Describe how you would locate by experiment the position of the image.

(b) An object situated on the principal axis of a concave mirror is 10 cms. in front of the mirror and the focal length of the mirror is 15 cms. Calculate the position of the image and show by means of a diagram how the image is formed. State whether the image is real or virtual.

[66 marks.]

6. Describe fully how a simple telescope may be constructed using two lenses.

Show by means of a diagram the paths of the rays by which an eye, on looking through the telescope, views the image of a distant object.

[67 marks.]

### SECTION III.

7. What is meant by magnetic induction? Describe an experiment to demonstrate it.

What is understood by (a) magnetic field, (b) lines of magnetic force?

A bar magnet is placed horizontally in the magnetic meridian with its north-seeking pole pointing south. Show by means of a diagram the nature of the resultant magnetic field and explain how you would plot the field.

[66 marks.]

8. Describe the gold-leaf electroscope and explain what may be observed when a charged body is brought near the cap.

Explain how you would use the gold-leaf electroscope (a) to show that when a glass rod is rubbed with silk, each acquires a charge of electricity opposite to that of the other, (b) to show that an induced charge is equal and opposite to the inducing charge.

[66 marks.]

9. Describe a method of measuring the resistance of a piece of wire. Show by means of a diagram how three two-ohm resistances may be connected, (a) in series, (b) in parallel.

What is the effective resistance in each case?

[67 marks.]

10. Give a brief account of the effect of passing a direct current of electricity through (i) acidulated water, (ii) a solution of copper sulphate.

Describe how to measure the electro-chemical equivalent of copper.

[67 marks.]