

# AN ROINN OIDEACHAIS.

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1956.

## PHYSICS.—PASS.

FRIDAY, 15th JUNE.—MORNING, 10 TO 12.30.

Not more than six questions to be answered.

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

### SECTION I.

1. Describe an experiment to measure the latent heat of fusion of ice.

A piece of metal weighing 50 grams and at a temperature of  $100^{\circ}\text{C}$ . is dropped into a cavity in a block of ice at  $0^{\circ}\text{C}$ . Assuming that there is no transference of heat except from the metal to the ice, find what mass of ice is melted.

[Specific heat of the metal =  $0.03$ ; latent heat of fusion of ice =  $80$  calories per gram.]

[66 marks.]

2. A force of 10 lb. weight acts in a direction OY which makes an angle of  $60^{\circ}$  with a straight line OX. What are the components of the force along and perpendicular to OX?

If another force of 6 lb. weight acts in the direction XO, find the direction and magnitude of the resultant of the two forces.

[66 marks.]

3. Define the units in which work and energy are measured.

A body, weighing 165 lb. is raised in 5 seconds from the ground to a point A, which is 20 feet above the ground. Calculate the work done on the body and also the rate of working in Horse-power.

If the body falls freely to the ground from the point, A, calculate its kinetic energy and velocity when it reaches a point 4 feet from the ground. [One horse power =  $550$  foot lb. per sec.]

[67 marks.]

### SECTION II.

4. Describe an experiment to measure the focal length of a concave mirror.

The focal length of a concave mirror is 10 cm. At what point on the axis of the mirror must a small object be placed so that its image will be 5 cm. from the mirror?

[66 marks.]

5. What is meant by the following terms: refraction, total reflection, index of refraction of a medium?

Give an account of an experiment (a) to illustrate total reflection, (b) to find the index of refraction of the glass of a given glass cube. [66 marks.]

6. Describe fully, with the aid of a diagram, a method of measuring the focal length of a convex lens by using a plane mirror.

Describe, with the aid of a diagram in each case, how a convex lens may be used (a) as a burning glass, (b) as a magnifying glass. [67 marks.]

### SECTION III.

7. Describe two experiments to demonstrate the production of electric charges by friction.

Describe and explain a method (a) of charging an insulated conductor by induction, (b) of ascertaining the sign of the charge on a charged conductor. What determines the sign of the charge in the case of charging by induction? [66 marks.]

8. Give an account of two experiments to demonstrate that the earth has a magnetic field.

What is meant by (a) the total intensity of the earth's field, (b) the horizontal component of the earth's field, (c) the angle of dip? If (b) and (c) are known at a given place, explain with the aid of a diagram how (a) may be calculated. [66 marks.]

9. Describe a simple voltaic cell and mention the changes which take place in it when current is being drawn from it.

What defects are associated with this type of cell and what modifications are necessary to overcome these defects? [67 marks.]

10. Describe the tangent galvanometer.

Explain how a tangent galvanometer may be used to compare the electromotive force of two cells. [67 marks.]