

AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1944.

PHYSICS.—PASS.

FRIDAY, 23rd JUNE.—AFTERNOON, 1.30 TO 3.30.

Candidates must answer one question at least out of each Section, and not more than *six* questions in all.

All questions are of equal value.

SECTION I.

1. Explain the meaning of the terms 'work' and 'power'. Mention the units in terms of which these quantities are measured. 1,000 gallons of water are delivered per minute by a motor-driven pump from a well 30 feet deep. Calculate the horse-power of the motor assuming the frictional losses to be negligible. (1 gallon of water weighs 10 lbs.; 1 horse-power = 550 foot lbs./sec.)

2. Describe a method for measuring the acceleration due to gravity. Mention possible sources of error.

3. State Archimedes' Principle. A body weighs 10 grams in air and 8 grams in a liquid of specific gravity 1.2. What will it weigh in a liquid of specific gravity 0.8?

4. Explain the terms (1) specific heat; (2) latent heat. 20 grams of steam at 100° C. are passed into a calorimeter containing 100 grams of water and 100 grams of ice. Assuming no loss of heat to outside bodies, what will be the final temperature? Water equivalent of calorimeter 20 grams. Latent heat of ice 80 calories/gram. Latent heat of steam 540 calories/gram.

SECTION II.

5. A printed page is placed on a table, and a thick cube of glass is placed upon it. When viewed through the cube, the print appears to be closer to the eye than it is in reality. Explain this, and show how the effect may be used to determine the index of refraction of the material of which the cube is composed.

6. Derive the mirror formula

$$1/v + 1/u = 1/f = 2/r$$

which gives the relationship between image distance, object distance, focal length and radius of curvature.

7. Describe any form of photometer and explain how you would use it to compare the illuminating powers of two lamps.

8. Describe any method of determining the velocity of propagation of light.

SECTION III.

9. Describe the gold-leaf electroscope. Explain how it may be used to distinguish between positively and negatively charged bodies, ebonite when rubbed will focal being taken to be negative.

10. A short bar magnet is fixed in the magnetic meridian at a place where the earth's field is uniform, with the south pole pointing north. Describe an experiment by means of which you could demonstrate or plot the lines of force of the resultant field. Furnish a rough sketch of the expected result. Indicate clearly the null points and explain why they occur.

11. Explain the working of a simple type of dynamo.

12. Describe the Metre Bridge, and show how you would use it to determine the resistance of a given sample of wire.