AN ROINN OIDEACHAIS M. 55

LEAVING CERTIFICATE EXAMINATION, 1967

PHYSICS - PASS

THURSDAY, JUNE 15 - Morning, 10 to 12.30

Six questions to be attempted.

1. Define (a) velocity, (b) potential energy, (c) kinetic energy.
A body with initial velocity, u, moves with uniform acceleration, f, in a straight line. Write down an expression for the velocity, v, acquired by the body after (i) a time t, (ii) a distance s.
What is meant by the 'acceleration due to gravity' ?
An object is thrown vertically upwards with a velocity of 128 ft. per. sec.; find the greatest height reached by the object. If the mass of the object is $\frac{1}{2}$ lb. calculate (i) its total energy when at the greatest height, (ii) its kinetic energy when one-fourth the distance up.
(Take g = 32 ft. per sec.^{2})
(66 marks)

2. Distinguish between temperature and quantity of heat.
Describe a mercury thermometer and indicate the principles on which its operation depends.
How may it be shown experimentally that the readings of a mercury thermometer agree closely with those of a gas thermometer ? Comment on the absolute zero of temperature.
(66 marks)

3. Explain each of the following terms with reference to wave motion: frequency, wavelength, amplitude, velocity.
How does the wave nature of light differ from that of sound ?
Describe how interference and diffraction patterns of light waves may be demonstrated in the laboratory.
(66 marks)

4. Describe an experiment to show that $\frac{\sin i}{\sin r}$ = constant (refractive index) for a given pair of media where i and r represent the angles of incidence and refraction, respectively.
Define critical angle. Calculate the critical angle for glass of refractive index 1·5.
Show how the refraction of light at a plane surface is explained on the basis of the wave theory.
(66 marks)

5. Distinguish between a real image and a virtual image and show by means of ray-diagrmas how each may be formed by a concave mirror.
An object is placed (i) 16 cm., (ii) 8 cm., in front of a concave mirror of focal length 12 cm. What is the nature and position of the image in each case ?
(66 marks)

6. Describe the construction and the mode of operation of (i) an X-ray tube, (ii) a thermionic diode. Give an account of the properties of X-rays or show how the diode may be used to rectify an alternating current.
(66 marks)

7. Write a note on the nuclear structure of the atom.
What are alpha particles, beta particles, gamma rays ? State the changes which occur in an atomic nucleus on the emission of (i) an alpha particle, (ii) a beta particle.
Describe how the nature of radiations emitted by a radioactive source may be identified by simple experiments.
(67 marks)

8. Describe an experiment (i) to measure the magnetic dip at a given place, (ii) to compare two low resistances.
(67 marks)

9. Give an account of an experiment to demonstrate electromagnetic induction.
State the principles underlying the operation of a simple alternating current generator.
Briefly indicate the function of a transformer.
(67 marks)

10. Write brief notes on any two of the following:
(a) gravitation,
(b) moving-coil meters,
(c) electrical condensers and capacitance (capacity),
(d) Faraday's laws of electrolysis.
(67 marks)