LEAVING CERTIFICATE EXAMINATION, 1963.

PHYSICS — PASS

FRIDAY, JUNE 14 — Afternoon, 3 to 5.30.

Not more than six questions to be answered.
One question, at least, must be answered from each section.

SECTION I.

1. State the three equations which describe uniformly accelerated motion in a straight line in terms of u(initial velocity), v(final velocity), a(acceleration), s(distance traversed) and t(time).
A mass of 100 gm. falls freely under gravity from rest.
Calculate (i) the distance it falls in 3 secs.,
(ii) its velocity after 3 secs.,
(iii) its kinetic energy, in ergs, after 3 secs. (66 marks.)

2. Describe how you would find experimentally the resultant of two non-parallel forces.
A body is acted on by a force of 20 gm. weight along OX and by another force of 40 gm. weight along OY which is inclined at 120° to OX. Find the magnitude and direction of the third force which must be applied to the body to maintain it in equilibrium.
(66 marks.)

3. Give an account of the standard Fortin barometer.
A common mercury barometer, constructed by a student, read 74·5 cm. while at the same time a standard barometer in the same laboratory read 75·8 cm. Suggest the factors which might be responsible for the difference in the barometer readings and explain how each factor influences the reading.
(67 marks.)

SECTION II.

4. Define the latent heat of fusion of ice. Explain, listing the measurements you would take, how you would calculate the latent heat of fusion of ice.
A calorimeter of water equivalent 7·5 gm., contains 60 gm. of water at 30°C. What weight of ice at 0°C. must be added to the water so that the final temperature is 10°C ? The latent heat of fusion of ice may be taken as 80 cal./gm. and complete thermal insulation may be presumed.
(66 marks.)

5.(a) Describe a method for finding the focal length of a concave mirror.
(b) An object is placed at a distance 30 cm. from a convex lens of focal length 20 cm. Find the position and magnification of the image
(i) by a graphical method,
(ii) by using the appropriate formula. (66 marks.)

6. Describe how you would examine experimentally the passage of a ray of light through a rectangular glass block.
Clearly explain these terms: angle of incidence, angle of refraction, refractive index, critical angle.
The refractive index of glass is 1·5 (air to glass) and that of water is 1·3 (air to water). Calculate the critical angle for (i) glass,(ii) water.
(67 marks.)

SECTION III.

7. An insulated positively charged sphere A is situated near the end of an insulated elongated uncharged conductor B. Describe fully how you would examine the resulting changes that occur on B and state the conclusions you would draw from such an examination.
Describe one of the following:
(i) the gold leaf electroscope,
(ii) the Wimshurst machine. (66 marks.)

8. Explain unit pole, magnetic field, field strength, magnetic moment of a magnet, line of force.
Calculate the field due to a bar magnet of length $2l$ and pole strength m, at a point on its major axis produced which is situated a distance d from the centre of the magnet.
(66 marks.)

9. Describe two experiments, one in each case, which illustrate the magnetic effect produced by a current flowing in (i) a straight conductor,
(ii) a conductor bent in circular form.
Describe the tangent galvanometer and explain how it is used to compare the strengths of two currents.
(67 marks.)

10. State Ohm's Law. Two resistances of 2 and 3 ohms respectively are connected in series with a cell of e.m.f. 1·5 volts and internal resistance 1 ohm. Find the current flowing in the circuit.
Explain briefly the principle on which the potentiometer is based. How would you use it to compare the e.m.f. of two cells ?
(67 marks.)