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(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1950.

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

PHYSICS.—HONOURS.

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

SECTION I.

1. A platform starting from rest on the ground ascends with a constant acceleration of 8 ft./sec.^{2} and when it is 36 feet above the ground a body resting on the platform is released through a trap-door. How long after it has left the platform will it take the body to reach the ground?

If the body weighs 168 lbs., calculate its thrust on the platform during motion.

2. When a train travelling at the rate of 30 miles per hour is at the top of an incline, the steam is cut off. The length of the incline is 1000 yards and its gradient is 1 in 100. At the foot of the incline the line is level. The train runs down the incline and comes to rest on the level line. Assuming that the forces resisting motion are equivalent to 10 lbs. weight per ton, find how far beyond the foot of the incline the train comes to rest.

3. Give a description of the process of evaporation (*a*) in an open vessel, (*b*) in a closed vessel.

Describe also how you would (i) measure the maximum vapour pressure of a liquid at various temperatures, (ii) find the boiling point of a liquid of which only a few drops are available.

SECTION II.

4. Describe how you would measure the focal length of (*a*) a concave mirror, (*b*) a diverging lens.

Describe the construction of the Galilean telescope (opera glass), and indicate by means of a diagram how the eye on looking through the instrument perceives a clear image of the object.

5. Describe fully any terrestrial method of measuring the velocity of propagation of light. Illustrate your answer by means of a diagram.

6. What do you understand by (*a*) deviation of light, (*b*) dispersion of light?

Describe, with the aid of diagrams, how you would use suitable prisms to produce (i) deviation without dispersion; (ii) dispersion without deviation.

Section III.

7. What do you understand by the magnetic moment of a magnet? Describe how you would compare the magnetic moments of two bar magnets. Prove any formula you use.

A short bar magnet is placed in a horizontal plane with its axis in the magnetic meridian and its north pole pointing south. At a point which is 50 cm. from the centre of the magnet and which lies on the production of the axis the resultant horizontal field is zero. If the horizontal component of the earth's magnetic field is 0·18 gauss, find the magnetic moment of the magnet.

8. Define the absolute units in which (*a*) the potential difference between the ends of a conductor, and (*b*) the current flowing in it, are measured, and hence deduce an expression for the rate of production of heat in a conductor due to the passage of an electric current through it.

The temperature of 300 grams of a liquid in a calorimeter is raised 3°C. per minute when a current of 1·8 amps is passed through a coil of 10 ohms resistance immersed in the liquid. If the specific heat of the liquid is 0·45, find the water equivalent of the calorimeter.

9. Prove the formula used in Wheatstone's bridge method of comparing resistances.

What is meant by the specific resistance of a material and how may it be measured?

10. State the laws of electromagnetic induction and describe how they may be tested experimentally.

Describe an induction coil and show how its working depends on these laws.