AN ROINN OIDEACHAIS.
(DEPARTMENT OF EDUCATION)

BRAINSE AN GHAIRM-OIDEACHAIS.
(TECHNICAL INSTRUCTION BRANCH.)

CERTIFICATE EXAMINATIONS
for

DAY VOCATIONAL COURSES, 1959.

MAGNETISM AND ELECTRICITY.

Tuesday, 16th June—10 to 12 noon.

Instructions.

Not more than *five* questions to be attempted.

All the questions carry equal marks.

1. Draw a diagram of the magnetic field near the poles of a horse-shoe magnet (*a*) when a magnet " keeper " is placed near to but not touching the poles, and (*b*) when a similar piece of brass is placed in the same position instead of the keeper.

2. State a rule to show the relationship between the direction of current in a straight conductor and the resulting magnetic field. You may explain your answer by means of a sketch.

Describe with the aid of a diagram how the direction of current in a straight wire could be determined using a compass needle.

3. Calculate the total resistance when resistors of 2 ohms, 3 ohms and 6 ohms are connected (*a*) in series, and (*b*) in parallel.

Determine the total current flowing in the parallel arrangement as a whole when 4 amperes flow in the 3-ohm resistor.

[P.T.O.

4. What do you understand by (a) a Kilowatt, (b) a Kilowatt hour.

If 200 volts are applied to a resistance of 40 ohms for 10 hours, calculate :—

      (i) the current supplied,

      (ii) the power supplied, and

      (iii) the cost of the energy supplied at 4d. a " unit."

5. What is the essential difference in construction between an ammeter and a voltmeter ?

Describe, giving a suitable diagram, how this difference could be shown, using an electric bell and a cell.

6. A battery of six cells, each of E.M.F. 1·5 volts and internal resistance 2 ohms, is connected to an external resistance of $\frac{2}{3}$ ohm. Calculate the current that flows through one cell, when the cells are (a) joined in series, (b) joined in parallel.

7. Define the ampere.

A current of 5 amperes flows through a resistance of 40 ohms for 8·4 minutes ; calculate :—

      (i) the heat generated,

      (ii) the applied voltage, and

      (iii) the energy supplied in Joules.

8. Define the electro-chemical equivalent of a substance.

An ammeter and a copper voltameter were connected in series, and a constant current allowed to flow through the arrangement for 1 hour 40 minutes ; it was found that 1·64 grams of copper were deposited on the cathode and the ammeter indicated 1 ampere during the experiment.

Calculate the error in the ammeter reading.

[The electro-chemical equivalent of copper is 0·000328 gram per coulomb.]