# AN ROINN OIDEACHAIS.
### (DEPARTMENT OF EDUCATION)

## AN BRAINSE GAIRM-OIDEACHAIS.
### (TECHNICAL INSTRUCTION BRANCH.)

## CERTIFICATE EXAMINATIONS

for

## DAY VOCATIONAL COURSES, 1955.

### MAGNETISM AND ELECTRICITY.

*Thursday, 16th June—10 to 12 noon.*

*Instructions.*

Not more than *five* questions to be attempted.

All the questions carry equal marks.

1. What is the difference in the magnetic properties of soft iron and steel ?

A bar magnet and a piece of iron of the same length are placed parallel to each other, and a short distance apart. Give a diagram of the resulting magnetic field and mark the polarity of the magnet, and the direction of the lines of force.

2. What is the essential difference between an ammeter and a voltmeter ?

In a bell circuit consisting of an electric bell, switch and Leclanche cell, what would be the effect of

(*a*) connecting an ammeter in series in the circuit.

(*b*) connecting a voltmeter in series in the circuit.

Give a diagram of how the instruments should be connected to indicate the current and voltage operating the bell.

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3. (a) How many calories of heat would a 500 watt heating element give in 1 hour ? (1 calorie$=$4·2 Joules).

(b) How long would the heater take to raise the temperature of 2,000 grams of water through 30°C. ?

4. Define (a) the Ampere, (b) the Joule.

If a consumer used 25 amperes from a 200 volt supply for 5 hours, calculate

(a) The resistance of the circuit.

(b) The quantity of electricity used.

(c) The cost of the energy supplied., if a B.O.T. unit costs 6d.

5. What are the factors influencing the resistance of a conductor ?

Calculate the specific resistance of copper, if a copper wire 250 metres long, and whose cross section is 0·08 sq. cm. has a resistance of 0·5 ohm.

6. Describe what occurs in, and give a diagram of, a copper voltameter. Explain how the voltameter can be used to determine the current flowing in a circuit.

7. Find (a) the greatest, (b) the least resistance obtainable by combining three resistors of 4 ohms, 6 ohms and 10 ohms respectively.

If the resistors were joined in series, and the arrangement connected to a 40 volt supply, what would be the voltage drop across each resistor ?

8. State a rule for finding the direction of the magnetic field around a straight conductor. Describe how this rule can be applied with the aid of a magnetic needle to determine the direction of current in a horizontal wire. What results in the conductor if the current suddenly ceases ?