AN ROINN OIDEACHAIS.

BRAINSE AN GHAIRMOIDEACHAIS.

CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1960.

MAGNETISM AND ELECTRICITY.

Monday, 13th June—10 a.m. to 12 noon.

Instructions.

Not more than *five* questions to be attempted.

All the questions carry equal marks.

1. Describe, with the aid of a diagram, how a steel knitting needle could be magnetised. How could the magnetised needle be tested to determine at which end a North pole was formed?

2. What do you understand by :—

   (a) a natural magnet, and

   (b) magnetic substances.

Two similar bar magnets are placed in line a short distance apart with their North poles facing each other. Draw a diagram of the magnetic field between the magnets, showing the direction of the lines of force.

What is the magnetic force at a point midway between the magnets?

What would be the effect of placing a sheet of copper between the magnets?

[P.T.O.

3. State Lenz's Law.

Apply the Law, drawing a suitable diagram, to show the direction of the induced current in a closed loop of wire when the North pole of a bar magnet is thrust inside the loop.

What will happen when the bar magnet is withdrawn from the loop?

4. What factors govern the quantity of heat generated by by an electric current in a wire.

If a 500-watt heater is immersed in 5,000 grams of water for 21 minutes, calculate the rise in temperature of the water. [4·2 Joules = 1 calorie.]

5. Define "specific resistance" or "resistivity" of a material.

Calculate the length of copper wire, 0·4 sq. millimetre cross-section, that would have a resistance of 2 ohms, if the specific resistance of copper is 1·6 microhms per cm. cube.

6. Define (a) the coulomb, and (b) the watt.

A 50-watt 200 volt lamp is lighting for 10 minutes at its rated voltage. Calculate :—

    (i) The current,

    (ii) the quantity of electricity used, and

    (iii) the resistance of the lamp when lighting.

7. Explain, with the aid of a diagram, what is meant by the anode, cathode, and electrolyte of a voltameter.

In an experiment to determine the electro-chemical equivalent of copper, a constant current of 2 amperes passed through a copper voltameter for 20 minutes. If the weight of copper deposited on the cathode was 0·768 gram, calculate the electro-chemical equivalent of copper.

8. Two resistors of 12 ohms and 6 ohms are connected in parallel, and joined in series with a resistor of 8 ohms. Calculate the total resistance.

If a supply of 60 volts is connected across the arrangement, calculate :—

    (a) the total current flowing, and

    (b) the voltage drop across the 8 ohm resistor.