

AN ROINN OIDEACHAIS.

(DEPARTMENT OF EDUCATION.)

AN BRAINSE GAIRM-OIDEACHAIS.

(TECHNICAL INSTRUCTION BRANCH.)

CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1951.

MAGNETISM AND ELECTRICITY.

Thursday, June 21st—10 to 11.30 a.m.

INSTRUCTIONS.

Not more than 5 questions to be attempted.

1. Explain why a bar magnet attracts a steel pin. Why does it not attract a brass pin?

Sketch what you believe to be the molecular condition of (a) an unmagnetised bar of iron; (b) a bar magnet; (c) a bar magnet with consequent poles.

(14 marks)

2. What is meant by the *resistance* of a conductor? Distinguish between the terms *electro-motive force* and *potential difference* as applied to a simple electric circuit.

Make a sketch of a simple circuit, insert in it an ammeter and a voltmeter and state exactly what each is measuring.

(14 marks)

3. Define *ampere*, *ohm* and *volt* and state the connection between these units.

Three resistors of 12 ohms, 8 ohms and X ohms are joined in series and take a current of 1.5 amperes when connected to a 60 volt supply. Calculate the value of X and the electric pressure across its terminals.

(16 marks)

[P.T.O.]

4. Sketch the magnetic field set up by a current flowing in (a) a straight conductor; (b) a conductor wound in a cylindrical coil. Indicate the direction of both current and field in each case.

Explain how the direction of a current in a straight wire can be found by the use of a magnetic compass.

(16 marks)

5. Distinguish between *primary* and *secondary* cells.

When a cell of E.M.F. 2.2 volts and internal resistance 0.5 ohms is connected to a resistor the P.D. across the cell is 1.8 volts. Calculate (a) the current flowing; (b) the value of the resistor in ohms.

(18 marks)

6. Define *watt* and *joule*.

An electric fire is used off a 220 volt supply and has a working resistance of 55 ohms. Calculate (a) the power developed; (b) the joules consumed per minute; (c) the price of energy per kilowatt-hour if its costs 11d. to use the fire for 5 hours.

(18 marks)

7. Define *temperature coefficient of resistance*.

The resistance of a coil of iron wire is 45 ohms. at 20°C. and is 65 ohms at 100°C. Calculate the temperature coefficient of resistance of iron. Derive any formula used from the definition.

(24 marks)

8. State (a) what you know of the structure of the atom, (b) how current flow is related to the electron.

Explain, with the aid of a sketch, the action of a simple two-electrode valve used as a rectifier.

(24 marks)