AN ROINN OIDEACHAIS.
(DEPARTMENT OF EDUCATION.)

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

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1950.

MAGNETISM AND ELECTRICITY.

Thursday, June 22nd—10 *to* 11.30 *a.m.*

INSTRUCTIONS.

Not more than 5 questions to be attempted.

1. Give an account of the *molecular theory of magnetism* and show how it helps to explain (*a*) magnetisation by stroking ; (*b*) destruction of magnetism ; (*c*) magnetic saturation.

[14 marks.]

2. Distinguish between the magnetic properties of steel and soft iron. Sketch and describe an electro-magnet and show clearly its polarity in relation to current flow.

[14 marks.]

3. State *Ohm's Law.*

Two resistors of 10 and 15 ohms are joined in parallel. What is the total resistance? If the combination is joined in series with a resistor of 4 ohms, and a P.D. of 6 volts is applied across the ends, calculate (*a*) the current taken from the supply ; (*b*) the voltage across the 4 ohm resistor.

[16 marks.]

4. What factors determine the resistance of a wire conductor?

A wire 20 yards long and 0·02 inch in diameter has a resistance of 55 ohms. Calculate the resistance of 25 yards of similar wire of diameter 0·025 inch.

[16 marks.]

5. Electric energy is sold at 4d. per unit. Name and define the unit meant in this statement.

An electric iron takes a current of 2·5 amperes when working off a 200 volt supply. Calculate (*a*) the power developed; (*b*) the cost of using for 3 hours at 4d. per unit; (*c*) the number of calories generated per minute.

[18 marks.]

6. What changes occur during the discharge of a lead-acid cell in (*a*) the voltage; (*b*) the specific gravity of the electrolyte; (*c*) the active material on the plates?

State the main precautions to be taken to keep such a cell in good condition.

[18 marks.]

7. How many cells each of e.m.f. 1·5 volts and internal resistance 0·75 ohm must be joined in series to send a current of 0·4 ampere through an external resistance of 36 ohms?

If *one* of the cells was connected the wrong way round by accident what current would flow?

[24 marks.]

8. Describe, with the aid of sketches, how you would use a potentiometer (*a*) to compare the E.M.F.'s of two cells; (*b*) to measure a small resistance; (*c*) to measure a large current.

[24 marks.]