AN ROINN OIDEACHAIS
BRAINSE AN IARBHUNOIDEACHAIS

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1971

MAGNETISM AND ELECTRICITY

TUESDAY, 8th JUNE, 9.45–11.45 a.m.

INSTRUCTIONS

(a) Not more than *five* questions may be attempted.
(b) All the questions carry equal marks.
(c) Illustrate your answers with sketches and diagrams where possible.
(d) Figs. 1, 2, 3, 4 and 5 are on the attached sheet which must be enclosed with your answer book.

1. Answer briefly the following:—
    (a) Explain (i) magnetic induction, (ii) magnetic screening. Give examples to illustrate your answer.
    (b) Describe two different ways of magnetising a screwdriver.
    (c) Draw on fig. 1 the magnetic field due to the bar magnets.

2. (a) State any rule giving the relationship between the current flowing in a straight conductor and the magnetic field which results from this current flow. State how you would verify this rule.
    (b) A current flows in the coil shown in fig. 2. Show the direction of the magnetic field on this diagram.
    (c) Describe with the aid of a diagram the working of an electric bell.

3. (a) State Lenz's Law.
    (b) Fig. 3 shows a diagram of an electric motor.
        (i) State which kind of electric motor is shown on fig. 3.
        (ii) Name each part.
        (iii) State how each part works.

4. State Ohm's Law and explain briefly, with the aid of a diagram, how you would verify it.
   An electric circuit is connected as shown in fig. 4. Calculate:—
    (a) the total resistance of the circuit.
    (b) the voltage drop across the $6\,\Omega$ resistor.
    (c) the current flowing through the $4\,\Omega$ resistor.

5. (i) Describe with the aid of a diagram what happens when a lead cell is (a) charged and (b) discharged.
   (ii) Describe how a Daniell cell works.

6. Four cells, each of e.m.f. 2V and internal resistance $\frac{1}{2}\Omega$, are joined in series to form a battery. The battery is connected to an external resistor of $6\,\Omega$.
   Find (i) the current flowing through the external resistor,
        (ii) the voltage drop over the external resistor,
        (iii) the p.d. of the battery.

7. Define (a) the Joule, (b) the Coulomb.
   A $10\,\Omega$ element is placed in a copper cup of mass 100 grams containing 30 grams of water at 10°C as shown in fig. 5. The element is connected to a 20V battery. Find the time required to boil the water.
   Specific heat of copper = 0·1; 1 calorie ≡ 4·2 joules.
   (Specific heat capacity of copper = 0·42 kJ/kg °C)

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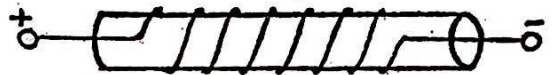### MAGNETISM AND ELECTRICITY

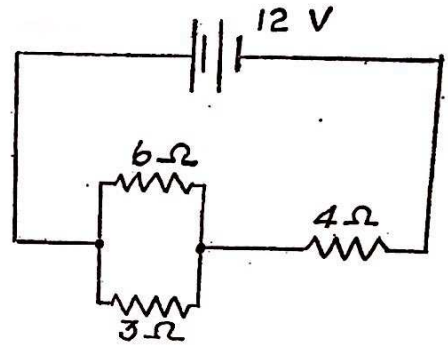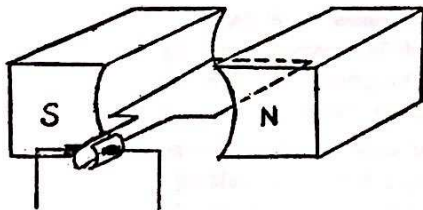EXAM. NO.....................................
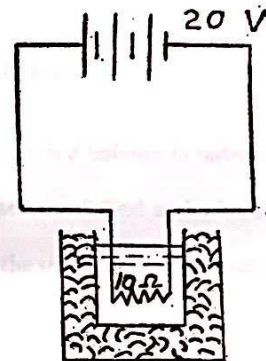
FIG. 2

FIG. 1

FIG. 4

FIG. 3

FIG. 5

N.B.—This page must be enclosed with your answer book.