DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1969

MAGNETISM AND ELECTRICITY

FRIDAY, 20th JUNE, 9.30 – 11.30 a.m.

INSTRUCTIONS

Not more than <u>five</u> questions to be attempted.
All the questions carry equal marks.
Illustrate your answers with sketches and diagrams where possible.
See enclosed sheet for Figs. 1, 2, 3; enclose this sheet 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 the magnetic field due to the earth.

   (c) Draw on Fig. 1 the magnetic field due to the bar magnets.

   (d) Explain how a screw-driver may be magnetised.

2. (a) State any rule that gives the relationship between the current flowing in a straight wire and the magnetic field set up by the current. Explain how this rule might be verified.

   (b) Describe, with the aid of diagrams, the principle of action of the electric bell.

3. (a) State Lenz's Law.

   (b) Explain the action of a simple D.C. motor and the purpose of the following:-

      (i) the carbon brushes, (ii) the commutator, (iii) the coil and (iv) the fixed magnets.

4. State Ohm's Law and show how it may be verified experimentally.
   In the circuit shown in Fig. 2, switch S_1 is closed, then switch S_1 is opened and switch S_2 is closed; finally switches S_1 and S_2 are both closed. Write in the box provided the reading on each instrument.
   State which of the available fuses should be used.

5. Explain briefly how an electric current flows through (a) a metal conductor, (b) an electrolyte.
   Describe how iron may be coated with copper.
   Find the mass of copper which would be deposited on the iron by a charge of 200,000 coulombs.
   (E.C.E. of Copper = 0·00032 grams/coulomb)

6. (a) Describe briefly the Leclanché cell and explain how it works.

   (b) 3 cells, each of E.M.F. 2 V and internal resistance $\frac{1}{2}$ ohm, are joined in series to form a battery. The battery is connected to an external resistance of $7\frac{1}{2}$ ohms.
      Find:-
      (i) the current through the external resistance;
      (ii) the P.D. of the battery.

7. Define (a) Joule, (b) Watt.
   A 4 ohm element is placed in a copper cup of mass 100 grams containing 90 grams of water at 10°C as shown in Fig. 3. Fill up the box in Fig. 3 giving the readings on each instrument.
   (S.H. of Copper = 0·1).

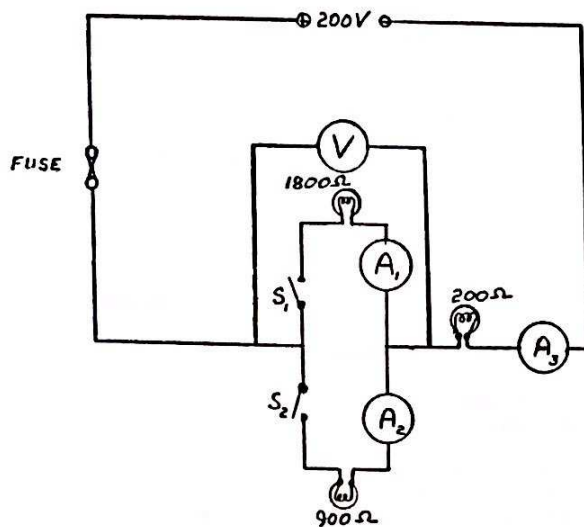DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1969
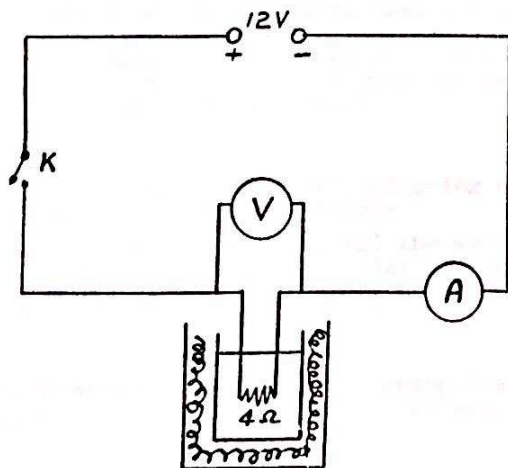
MAGNETISM AND ELECTRICITY

EXAM. NO. _____

Fig. 1.

S N   N S

Fig. 2.

⊕ 200V ⊖

FUSE

V

1800Ω

A₁

200Ω

A₃

S₁

S₂

A₂

900Ω

ACTION	V	A₁	A₂	A₃
Switch S₁ closed				
Switch S₂ closed				
Switch S₁ and S₂ closed				

Fuses available ¼ amp, ½ amp, 1 amp, 5 amp, 10 amp and 15 amp.

Fig. 3.

12V
+ −

K

V

A

4Ω

ACTION	V	A	T
Key K is closed for 14 minutes			

T is the water temperature after 14 minutes heating.

N.B. TO BE ENCLOSED WITH YOUR ANSWER BOOK.