

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1969

SCIENCE (SYLLABUS A)

WEDNESDAY, 18th JUNE - 9.30 a.m. to 12.00 noon.

Answer any six questions from this paper.

All questions carry equal marks.

SECTION A. PHYSICS.

1. Define energy and state the principle of conservation of energy. Energy exists in many different forms. Name four of these forms and give examples in each case.
Describe the energy changes which occur when a battery torchlight is switched on.

2. Name the three methods by which heat is transferred from one place to another and give one everyday example of each.

Draw a labelled sketch of a thermos vacuum flask and describe its construction. Explain why hot liquid placed in this type of flask will remain warm for a long period.

3. Describe, with the aid of labelled diagrams, a gold-leaf electroscope, and explain each of the following:-

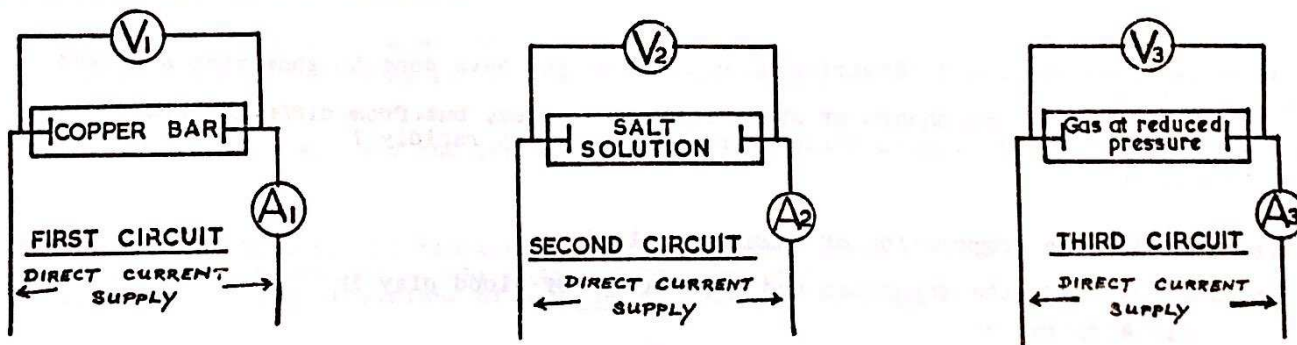
- (a) When a charged ebonite rod is brought near to an uncharged gold-leaf electroscope, the leaves of the electroscope diverge;
- (b) A gold-leaf electroscope can be charged positively by means of a negatively charged ebonite rod;
- (c) If the electroscope is charged and left, the leaves gradually collapse, this collapse being accelerated when a bunsen flame is moved about near the cap of the electroscope.

4. The diagrams show three electric circuits. In the first circuit a copper bar fills the space between the electrodes, in the second circuit a salt solution replaces the copper bar, while a gas at reduced pressure replaces it in the third circuit. The ammeters A_1 , A_2 and A_3 all show the same reading.

(i) Which of the voltmeters, V_1 , V_2 , V_3 , shows the highest reading ?

(ii) Which voltmeter shows the lowest reading ?

Explain how the current is conducted in each case and give reasons for the difference in the readings of the voltmeters.



SECTION B. CHEMISTRY.

5. Write down the chemical formula for each of the following: Sulphuric acid; Sodium hydroxide; Copper (II) oxide (cupric oxide); Sulphur dioxide; Oxygen gas.

State in words and also by means of an equation employing chemical symbols, what happens when:-

- (a) Copper (II) oxide reacts with hydrogen,
- (b) Sulphur reacts with Oxygen, and
- (c) Sodium hydroxide reacts with sulphuric acid.

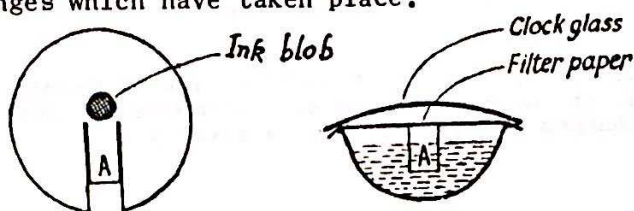
6. (a) The atomic number of sodium is 11 and its atomic weight is 23. Explain the terms "atomic number" and "atomic weight".
- (b) Give the relative mass and charge of each of the three constituent particles of the atom. Draw a labelled diagram showing how these particles are arranged in (i) the sodium atom, and (ii) the sodium ion.

7. (a) Explain the difference between:-

- (i) a physical change and a chemical change;
 (ii) an element and a compound.

Give examples in each case.

- (b) A blob of black ink is placed in the centre of a filter paper and allowed to dry. A short wick, A, is cut in the filter paper (as shown in the diagram). The filter paper is then placed flat over the top of an evaporating basin containing a mixture of some alcohol and water. The wick, A, is pressed into the mixture and the outside of the filter paper is pressed over the edge of the basin. A clock glass is placed over the top. State what you would observe after a period of time and explain the changes which have taken place.



8. What is the meaning of allotropy. Name two allotropes of either carbon or sulphur. State the main differences in properties between the two allotropes you have named. How do you explain these differences?

SECTION C. BIOLOGY.

9. Give an account, under the following headings, of a terrestrial habitat which you have examined:-

- (a) Description of habitat;
 (b) Type of soil;
 (c) Six plants found there;
 (d) Six animals found there;
 (e) Adaptation of plants and animals, found there, to that particular environment.

10. (a) Draw a carefully labelled diagram of the digestive system of any mammal you have examined.

(b) What is an enzyme? Describe the functions of enzymes in the animal body.

11. What is transpiration? Describe an experiment you have done to show that a potted plant transpires. If you were given two shoots of about equal leaf area, but from different plants, how would you find out by experiment which transpired the more rapidly?

12. (a) Describe the composition of mammalian blood.

(b) What parts do the structure and circulation of blood play in

- (i) Respiration;
 (ii) Nutrition;
 (iii) Defence of the body against invasion by germs?