

UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION

MAIN EXAMINATION PAPER

B. Ed. III / PGCE

May 2018

Title of paper: Curriculum Studies in Chemistry

Course number: EDC 379/CTE330/CTE530

Time allowed: 3 hours

Instructions:

1. This paper contains FIVE questions.
2. Answer **any four** questions.
3. Marks for each question or sub-question are indicated at the end of the question
4. Any piece of material or work which is not intended for marking purposes should be clearly **CROSSED OUT**
5. Ensure that responses to questions are **NUMBERED CORRECTLY**
6. The examination paper comprises three pages and a two page attachment

Special Requirements

NONE

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR

QUESTION 1

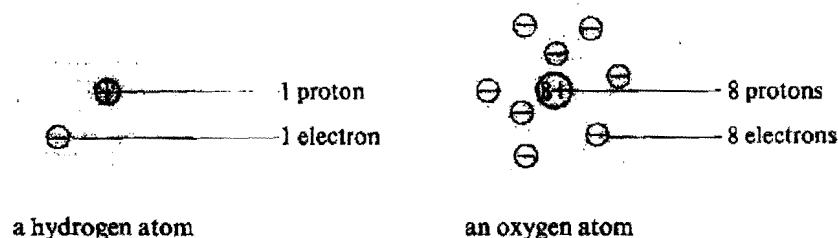
The extract below is taken from a **Chemistry book**. Study the contents and the answer the questions below it

6.2 Protons, electrons and atomic number

The nucleus of an atom contains **positively-charged particles**. These particles are called **protons**. Each proton has one unit of positive charge.

Around the nucleus of the atoms are **negatively-charged particles**. These are called **electrons**. Each electron has one unit of negative charge.

In a neutral atom there is always the same number of protons and electrons:



a hydrogen atom

an oxygen atom

All the atoms of one element are identical. They all have the same number of protons. All carbon atoms have 6 protons, for example. Atoms of different elements have different numbers of protons: carbon atoms have 6 protons but oxygen atoms have 8 protons.

The number of protons in an atom is therefore very important. It tells us which element the atom belongs to. Because this number is so important it is given a special name. It is called the **atomic number** and has the symbol *Z*. **The atomic number of an element is the number of protons in an atom of the element.**

The elements are listed in the Periodic Table in order of their atomic numbers:

Table 6.1

<i>Element</i>	<i>Number in Periodic Table</i>	<i>Atomic number</i>	<i>Number of protons</i>	<i>Number of electrons</i>
Hydrogen	1	1	1	1
Helium	2	2	2	2
Carbon	6	6	6	6
Oxygen	8	8	8	8
Chlorine	17	17	17	17
Lead	82	82	82	82

- a) Identify, and state **three** chemistry concepts (chemical ideas) pupils may learn from the passage. [6]

- b) Describe the functions of **concepts** in learning chemistry. [6]
- c) Describe how you might determine if the **Chemistry book** from which the extract given above was taken is suitable for selection as a learners' textbook. [6]
- d) Identify, and justify, a strategy that was used in the extract to facilitate learner understanding of concepts in the extract. [7]

QUESTION 2

Discuss language in the teaching and learning of school level Chemistry. Your discussion should **also** attend to the following:

- Functions of language in teaching chemistry
- Language related barriers and
- Strategies to minimise the barriers [25]

QUESTION 3

- a) Discuss how the following **two** factors may constrain successful teaching of chemistry in schools.
- i) Teachers [8]
- ii) Infrastructure [7]
- b) Describe **five** benefits of preparing a scheme of work prior to embarking on chemistry teaching. [10]

QUESTION 4

- a) For the sub-topics C12.1 Air and C12.2 Water given in **QUESTION 5 BELOW** suggest, and justify, a sequence for teaching the chemical ideas in the two subtopics by indicating lesson topics in your suggested sequence. [10]

b) Suggest and justify **three** resources you might use to teach any of the lesson topics stated in (a) above. Your discussion should attend to the followings aspects for each resource:

- i) ways in which each suggested resource is appropriate for the lesson topic
 - ii) how you would use the resources to maximise learning
- [15]

QUESTION 5

Study the sub-topics C12.1 Air and C12.2 Water under Topic 12.0 Non-metals given in the syllabus section below.

12.0 Non-metals

All learners should be able to:

C12.1 Air

1. describe the volume composition of air
2. describe the fractional distillation of liquid air to obtain oxygen gas, nitrogen gas and the noble gases for industrial use
3. name common pollutants in air as carbon monoxide, sulfur dioxide, oxides of nitrogen, lead compounds, chlorofluorocarbons (CFCs) and excess carbon dioxide
4. describe the sources of each of the pollutants:
 - carbon monoxide from incomplete combustion of carbon-containing compounds,
 - sulfur dioxide from the combustion of fossil fuels containing sulfur compounds leading to 'acid' rain,
 - oxides of nitrogen from car exhausts,
 - lead compounds from car exhausts,
 - excess carbon dioxide from the combustion of fuels and
 - CFCs from aerosol sprays
5. state adverse effects of the pollutants on:
 - buildings (SO₂ and oxides of nitrogen),
 - plants (SO₂ and oxides of nitrogen)
 - health (oxides of nitrogen, sulfur dioxide, lead compounds, carbon monoxide)
 - the ozone layer (CFCs)
6. state the composition of catalytic converters in car exhaust systems (palladium, platinum and rhodium)
7. explain the importance of catalytic converters in car exhaust systems to remove carbon monoxide and oxides of nitrogen
8. describe the role of carbon dioxide in global warming
9. describe the role of ozone in absorbing ultraviolet (UV) radiation

C12.2 Water

1. describe and perform a chemical test for water using anhydrous copper(II) sulfate or cobalt(II) chloride
2. distinguish between the ion content of soft and hard water
3. distinguish between temporary hardness and permanent hardness.
4. state advantages and disadvantages of hard water as having health, domestic and industrial implications
5. describe how hard water can be made soft by boiling, distillation and by using an ion exchanger
6. describe, in outline, the purification of water in terms of filtration, sedimentation and chlorination

C12.3 Hydrogen

Identify, and justify, **five** aspects that make these sub-topics relevant for Swaziland.

[25]

END OF EXAM PAPER