

**UNIVERSITY OF SWAZILAND**

**FACULTY OF EDUCATION**

**MAIN EXAMINATION PAPER 2010**

**B. Ed. II**

**May 2010**

**Title of paper:** Curriculum Studies: Chemistry

**Course number:** EDC 279

**Time allowed:** 3 hours

**Instructions:**

1. This paper contains FIVE questions.
2. Question 1 is COMPULSORY. You may then choose ANY TWO questions from questions 2, 3, 4, 5.
3. Marks for each 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. This paper comprises six printed pages

**Special Requirements**

**Selected topics from SGCSE Physical Science syllabus 6888 (Chemistry section)  
Selected Textbook chapters**

## SECTION A

### QUESTION 1

**This question is compulsory**

Attached is an activity, *Activity 4.13* and some background information taken from Science in Everyday Life used for the Junior Certificate Science. Study the activity and answer the following questions.

- a) Formulate and write a title for Activity 4.13. [2]
- b) State, and justify the processes of science learners are likely to engage in while working on Activity 4.13 (**only**). [16]
- c) Identify, and state the manipulative skills that learners may use while working on Activity 4.13. [10]
- d) Construct three assessment items to assess learning from the activity (your items should be above knowledge level). [12]

## SECTION B

**Choose and answer any two questions**

### QUESTION 2

- a) Developing a table of specification before constructing an assessment instrument is considered an important step.  
  
Discuss the advantages of constructing a table of specification for a chemistry assessment instrument? [10]
- b) The attached test was constructed by a student teacher. Study the test and
  - i) construct a marking guide for this test. [10]
  - ii) critique the test considering the various aspects of a good test. [10]

### QUESTION 3

Selecting the most appropriate method for teaching a specified content area is an important step in lesson planning.

- a) State and justify three other factors that may determine the choice of teaching method for a lesson. [6]
- b) Show, with clear justification, what method of teaching you might consider appropriate for teaching the following content.

Core	Extended
C7.3 Speed of reaction - ... - ...	- <i>show awareness that light can provide energy needed for certain chemical reactions by: describing the use of silver salts in photography i.e. reduction of silver salts to silver, stating that photosynthesis leads to the production of glucose from carbon dioxide and water in the presence of chlorophyll and sunlight (energy).</i>

[10]

- c) How might you ensure maximum learning benefit when using the identified method? [8]
- d) Construct **two** learning outcomes for a lesson on the above content that a teacher may wish to attain in learners during the lesson. [6]

### QUESTION 4

- a) *"Effective learning in the classroom depends on the teacher's ability ... to maintain the interest that brought students to the course in the first place" (Ericksen, 1978, p. 3). Whatever level of motivation your students bring to the classroom will be transformed, for better or worse, by what happens in that classroom (Davis, 1999).*

Discuss how the following factors may transform learner motivation to learn chemistry:

- i) Subject matter [6]
- ii) Teacher preparation [6]
- iii) Role models [5]
- b) Hodson (1990) notes that practical work does not always succeed in raising and maintaining learner motivation. Discuss some of the reasons why practical work may fail to sufficiently motivate learners to learn chemistry? [13]

### QUESTION 5

- a) Suppose you are going to teach learners about the differences between ionic and covalent compounds (see syllabus section for learning outcomes and content coverage).
- i) Describe specific practical work activities that you could engage learners in to learn the chemistry specified in the syllabus. [15]
  - ii) What scientific knowledge might learners acquire from the outlined activities? [8]
- b) A teacher could also use the demonstration method to teach the same content. What might be the advantages of using the demonstration method? [7]

# EDC 279 - Question 1

## Unit 6 Metals are known to be strong

A young girl, Nontobeko, went to town to recharge a car battery which she used as a source of power for the television at home. The attendant greased the battery terminals using a sticky substance. The girl asked, 'Why are you putting on the grease? It will make me dirty!'

'This grease will protect the battery terminals, otherwise they would be eaten away' by the liquid in the battery,' answered the attendant. 'You should handle the battery with care because the liquid is dangerous,' continued the attendant.

'What do you mean? What kind of liquid is this? In what way can it be dangerous?' asked Nontobeko without waiting for an answer. If you were the attendant, how would you answer Nontobeko's questions?

When Nontobeko got off the bus with the battery some liquid spilled onto her dress. When she arrived home her dress had holes where the liquid had spilt. What do you think caused the holes on Nontobeko's dress? She put the wet battery on top of a metal plate to avoid dripping the floor next to the television set. A few days later she noted some white substance between the metal plate and the battery where the liquid was dripping. What was this white substance and what made it form between the battery and the metal plate?



1. What is the name of the liquid in the battery?
2. What are battery terminals made up of?
3. How would the applied grease protect the battery?
4. What do you think would have eventually happened to the plate if it had been left under the battery for a long time?

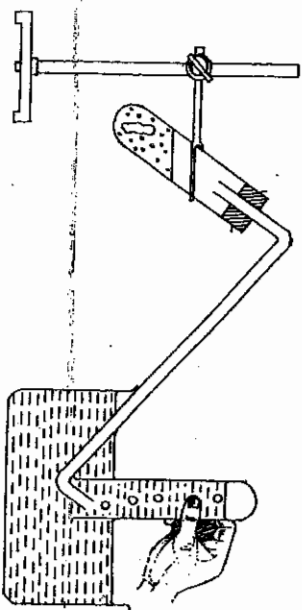
### ACTIVITY

#### Activity 4.13

Nontobeko wanted to know what the white substance was and how it had formed. Carry out an experiment to help her find out.

You will need dilute hydrochloric acid, magnesium ribbon, steel wool, four test tubes, a test tube rack, four stoppers, glass tubing, a Bunsen burner, a splint and water in a container.

1. Read the instructions that follow and set up your apparatus as shown in the diagram.



2. Scrape the surface of the magnesium ribbon using the steel wool to remove the top layer.
3. Dip the magnesium ribbon into the acid and quickly close the test tube to avoid loss of the gas.
4. Let the first few bubbles go before you collect the gas. Explain why it is important to release the first few bubbles.
5. Collect three test tubes of the gas produced, put them in a test tube rack and make sure they are tightly closed.
6. Light up the splint and insert it in each of the test tubes as soon as you open it.
7. Record your observations in your exercise book.
8. Repeat step 6 with another test tube, but this time, leave the test tube open for a short while before inserting the lighted splint.
  - (a) Record your observations.
  - (b) Give a reason for the observations in (a) above.
  - (c) Use your observations and explanation in (a) and (b) above to compare the density of the gas to that of air.

9. What gas do you think has been produced?

The 'pop' sound that is produced when the lighted splint is inserted into the test tube containing the gas indicates that the gas is hydrogen. The 'pop' sound is a little explosion that occurs because hydrogen burns quickly. This means that it is highly flammable. What do you think would be the problems of having hydrogen as one of the main gases found in air?

Hydrogen is less dense than air. Therefore when a test tube containing the gas is opened, facing the right side up, the gas quickly escapes and moves upwards.

Do not spill the solution that remains in the reaction test tube after the gas has been collected. You will need it for Activity 4.14.

10. What do you think would happen if the magnesium ribbon were coated with grease (or petroleum jelly) before being dipped into the acid? Explain your answer. Your teacher may do a short demonstration to illustrate what would happen. Did you correctly explain how the attendant's grease protected Nontobeko's battery in the Over to you questions?

What do you think the solution that remains after collecting the gas contains? Do the activity below to find out.

## Zombodze National High School

Form 4B

Chemistry Test

16 June 2009

45 min

Total: 40 marks (ANSWER ALL QUESTIONS)

### Molecular compounds

1. Define a molecular compound and select **all** molecular compounds from the following:  
a)  $\text{NO}_2$       b)  $\text{H}_2\text{O}$       c)  $\text{NaCl}$       d)  $\text{CaS}$       e)  $\text{NOCl}$       f)  $\text{SiCl}_4$   
[5 marks]
2. Give the chemical **symbols** of the following and identify each one as a **metal**, a **non-metal**, or a **metalloid**:  
i) Potassium  
ii) Sulphur [2 marks each]  
iii) Silicon
3. Because of the enormous number of different compounds chemists have worked on certain guidelines to name them. Considering both the systematic and non-systematic manner;  
a) **Name** the following molecular compounds [2 marks each]  
i)  $\text{CS}_2$       ii)  $\text{SO}_3$       iii)  $\text{NH}_3$       iv)  $\text{CCl}_4$       v)  $\text{PCl}_5$   
b) Write the correct molecular **formulae** for the following names;  
i) Sulphur hexafluoride  
ii) diphosphorus pentoxide  
iii) Sulphur dioxide [2 marks each]  
iv) Hydrogen bromide  
v) Carbon monoxide
4. Write in words what is meant by the following;  
a)  $4 \text{SO}_2$   
b)  $3 \text{C}_6\text{H}_{12}\text{O}_6$  [3 marks each]  
c)  $\text{H}_2$