

UNIVERSITY OF SWAZILAND
FACULTY OF EDUCATION
MAIN EXAMINATION PAPER 2012
B. Ed. II/PGCE

December 2012

Title of paper: Curriculum Studies: Chemistry

Course number: EDC 279

Time allowed: 3 hours

Instructions:

1. This paper contains SIX questions.
2. Question 1 is COMPULSORY. You may then choose and answer ANY THREE questions from questions 2, 3, 4, 5, 6.
3. Marks for each question are indicated at the end of the question.
4. Any piece of material or work that is not intended for marking purposes should be clearly CROSSED OUT.
5. Ensure that responses to questions are NUMBERED CORRECTLY.

Special Requirements

SGCSE Physical Science syllabus 6888 (Chemistry section)

Sheet A and Sheet B - attached

QUESTION 1

This question is compulsory

a) Attached (Sheet A) is an activity from Science in Everyday Life: Learner's Book 2. Study the activity and then answer the questions that follow.

i) What teaching methods might this activity be used in conjunction with? [2]

ii) Identify and state the processes of science that pupils may engage in while using this activity. **Write your answers on the attached sheet** and submit it together with your answer book (Remember to indicate your examination number). [8]

iii) Identify and state **four examples of scientific knowledge** pupils may learn. [4]

iv) What justification might you give for a teacher's choice of the method(s) identified in (a) i) above? [5]

b) Explain the following expressions about a scientific field of study:

i) Scientific knowledge is tentative. [2]

ii) Science values open-mindedness, as well as skepticism. [4]

[25]

QUESTION 2

Science as a discipline has characteristics that enable its teaching to fulfil the development of pupils' affective, cognitive and psychomotor abilities.

a) What characteristics is science thought to possess that enable its teaching to develop pupils' affective, cognitive and psychomotor abilities? [3]

b) Describe, with the aid of examples from the school chemistry curriculum, how these characteristics of science can facilitate development of abilities in these three aspects. [22]

[25]

QUESTION 3

- a) The use of practical work in teaching chemistry serves several aims.

Two of the aims of practical work are:

- To teach pupils scientific (chemistry) knowledge
 - To help pupils develop laboratory skills
- i) Give **TWO** justifications to show how practical work can achieve the stated aims. Use illustrative examples to support your answer. [8]
- ii) State, and justify, **FOUR** precautions a teacher might need to take when using practical work in teaching chemistry in order to maximize attainment of each of these aims? [8]

- b) Study the syllabus content for Topic C6 Stoichiometry (see Physical Science (chemistry syllabus)).

- i) State **TWO** teaching methods you might consider suitable for maximizing the learning of the content dealt with in the topic "Stoichiometry". [2]
- ii) Discuss the strengths of the identified methods for teaching the content in stoichiometry. [7]

[25]

QUESTION 4

- a) Refer to Sheet A, attached, to answer this question.

- i) What might be the aim of a lesson involving the activity in Sheet A? [2]
- ii) State two learning outcomes that may be attained through the use of this activity. [4]
- iii) Construct an introduction for a **lesson** that could use the activity outlined in Sheet A. [5]

- b) Discuss the benefits of developing a detailed scheme of work for a chemistry teacher? [14]
- [25]

QUESTION 5

Some students seem naturally enthusiastic about learning, but many need-or expect-their instructors to inspire, challenge, and stimulate them: "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).

- a) Identify and briefly explain the aspects of motivation Davis (1999) is referring to in the above excerpt. [8]
 - b) Discuss how the following factors may affect pupils' motivation in a chemistry classroom.
 - i) Chemistry subject matter [7]
 - ii) Teacher preparation for teaching [7]
 - iii) Pupils' aspirations [3]
- [25]

QUESTION 6

Sheet B, attached, presents two assessment items that were part of a test used by a student teacher during teaching practice.

- a) Suggest a **syllabus** topic on which these items might be focused on. [1]
 - b) Classify each of these items according to the principles of classifying assessment items. [4]
 - c) Reconstruct these two items so as to assess pupils' practical skills. [16]
 - d) Discuss the strengths of assessing the content using the approach suggested in Question 6 (c). [4]
- [25]

Sheet A

Activity 4.3 What are the properties of some substances?

You will need: six beakers, two watch glasses, a spatula, a stirring rod, vinegar, baking powder, bicarbonate of soda, lemon juice, apple juice, *emahewu*, toothpaste, ash powder, access to clean water

Carry out the activity and record your results in a table similar to the one on the next page.

| Name of Substance | Is it bitter or sour? | Other taste? (describe) |
|---------------------|-----------------------|-------------------------|
| Vinegar | | |
| Baking powder | | |
| Bicarbonate of soda | | |
| Lemon juice | | |
| <i>Emahewu</i> | | |
| Toothpaste | | |
| Ash | | |
| Apple juice | | |

1. Add a small amount of each of the substances to the beakers.
2. Use the stirring rod to put a drop or two of one liquid onto your tongue to taste.
3. Record the taste next to the corresponding substance in your table.
4. Thoroughly rinse your mouth with clean water before tasting the next substance.
5. Repeat steps 2 – 4 for all the substances.
6. Use about half a spatula of the ash and tooth paste. Put a little bit of the ash and the tooth paste on the tongue to taste.

Use your findings from the activities in the last unit to complete the table below.

| Name of substance | pH Value | Is it acidic or alkaline? |
|---------------------|----------|---------------------------|
| Vinegar | | |
| Baking powder | | |
| Bicarbonate of soda | | |
| Lemon juice | | |
| Toothpaste | | |
| Ash | | |
| Apple juice | | |

Using your results and information from the table above, complete the following sentences:

Most acids have a _____ taste.

Most alkalis have a _____ taste.

It is very important to note that not all acidic substances have a sour taste. There are some bitter substances that are acidic. This means that it is not reliable to taste a substance in order to find out if it is acidic or alkaline. It can also be dangerous to taste unknown chemicals! We should always use indicators to find out if they are acidic or alkaline.

Sheet B

2

A small child has mixed together the salt and the pepper in the kitchen. Salt is soluble in water. Pepper is not soluble in water. Describe how to obtain salt and pepper separately from this mixture.

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.....[4]

3

A student uses paper chromatography to investigate three substances, X, Y and Z. The result of her experiment in Fig. 4.1 shows three components, P, Q and R.

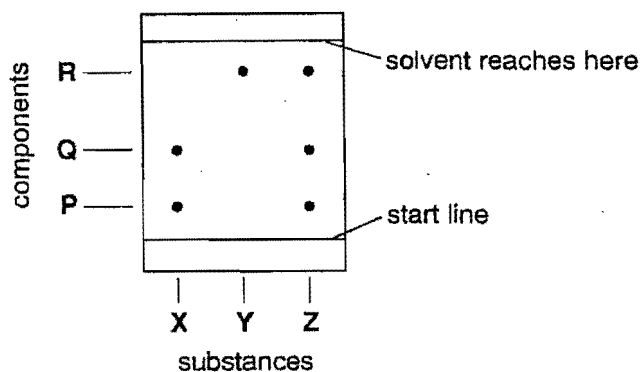


Fig. 4.1

(a) State and explain which substance is a mixture of the other two.

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.....[2]

(b) State and explain which component is most soluble in the solvent.

.....

.....[2]