

UNIVERSITY OF ESWATINI

FACULTY OF EDUCATION

MAIN EXAMINATION PAPER

NOVEMBER/DECEMBER 2018

B. Ed. III /PGCE

Course Code/Title of paper: CTE329/CTE529 Curriculum Studies in Chemistry I

Time allowed: 3 hours

Instructions:

1. This paper contains FIVE questions.
2. Question 1 is COMPULSORY. You may then choose and answer ANY THREE questions from Questions 2, 3, 4, 5.
3. Each question carries 25 marks. Marks for each question and 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.

Special Requirements:
NONE

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

QUESTION 1

This question is compulsory

- a) Suppose you wish to use the activity "*Practical 1*" below for a lesson involving practical work.

<i>Practical 1</i>	
Chemicals:	-- Sulphuric acid (2 mol/dm ³) -- copper(II) oxide
Equipment:	test tube and rack, spatula
Safety:	Handle the sulphuric acid with great care. If spilled on skin or cloth rinse with lot of water.
Procedure:	Put in a test tube about half a spatula full of copper(II) oxide. Pour about 5 ml of a solution of sulphuric acid (2 mol/dm ³) in the test tube. Mix well and allow to stand for about 5 minutes: the copper oxide that did not react will sink to the bottom. What colour does the solution now have?
Questions:	1) Which ions were present in the sulphuric acid solution? 2) What colour is CuO? 3) What is the colour of the solution after reaction? 4) Which ion could be responsible for the colour of the solution after reaction? 5) Write down and balance the ionic equation of the reaction that took place. 6) If you want to prepare a pure solution of copper (II) sulphate, how would your procedure look like and why? (think of reagents in excess). 7) How could one make solid copper(II) sulphate using this procedure?

- i) Suggest an aim for "*Practical 1*" [2]
- ii) Indicate **process(es) of science** which learners may engage in while performing "*Practical 1*" [9]
- iii) Construct **three** learning outcome that could be targeted for attainment through the activity in *Practical 1*. [6]
- b) Why might the lecture method be suitable for teaching chemical bonding? [8]

QUESTION 2

- a) Chemistry as a subject can successfully support the attainment of learning outcomes in all the domains of learning.

Suggest a justification for the statement [12]

- b) Use the SGCSE Physical Science syllabus learning outcomes for the sub-topic **C8.3 Speed of reaction** given below to guide responses to the items that follow:

SGCSE PHYSICAL SCIENCE Syllabus 6888
November 2019 and November 2020 Examinations

C8.3 Speed of reaction

1. define speed of a reaction
2. define a catalyst
3. classify catalysts into inorganic and organic (enzymes) catalysts
4. investigate the effect of concentration, particle size, catalysts (including enzymes) and temperature on the speed of reactions
5. plot graphs and interpret data obtained from experiments concerned with speed of reaction
6. explain the effect of concentration, particle size, catalysts (including enzyme) and temperature on the speed of reactions in terms of the collision theory
7. describe the application of the above factors to the danger of explosive combustion with fine powders (e.g. flour mills) and gases (e.g. mines)
8. devise and explain a suitable method for investigating the effect of a given variable on the speed of a reaction

Choose **two** teaching methods that might be suitable for teaching learners the content dealt with in the sub-topic.

- i) Describe the characteristics of each chosen method. [4]
- ii) Explain your choice of the two methods. [9]

QUESTION 3

Assessment of learning is an important step in the education of learners in Chemistry.

- a) What functions might assessment play in teaching and learning of Chemistry? [10]
- b) Specification grids (tables) are critical steps when developing assessment instruments.

Discuss the importance of constructing a specification grid for Chemistry tests and examinations? [15]

QUESTION 4

- a) State **four** functions of resources in chemistry. [8]
- b) Suppose you wished to use Moly-mod models (also known as atomic/molecular or ball and stick models) to teach concepts from the Chemistry syllabus sub-topic given below, taken from the Topic **C13.0 Organic chemistry**:

C13.4 Homologous series

All learner should be able to:

1. Describe the homologous series as a family of similar compounds with similar properties due to the presence of the same functional group
2. Describe the general characteristics of a homologous series (ECOS (2018). SGCSE Physical Science Syllabus; p15)

- i) What might be the strengths of these models for the given sub-topic? [9]
- ii) What precautions might you take when using atomic/molecular models for teaching? [8]

QUESTION 5

- a) Suppose you gave learners in your class the passage on **Isotopes** shown below to read for homework.

Isotopes

Neutrons have no electrical charge so they need not be balanced out by a particle of a different charge. The number of neutrons may therefore vary without altering the proton and electron number. This would result in an element having different versions of its atoms. Each version has the same number of protons and electrons but a different number of neutrons. These different versions are called **isotopes**, which are defined as **atoms with the same number of protons but different numbers of neutrons**. They vary in mass but they are all atoms of the same element.

Accordingly, the relative atomic mass of an element takes into account all the possible isotopes of that element. It is a weighted average (an average taking into account the abundance of each isotope) of all the isotopes. The isotopes of an element all have the same chemical properties. They differ in physical properties such as density and mass. Table 6 gives examples of some isotopes.

Table 6

Element	Symbol	No. of protons	No. of neutrons	Mass number
carbon	$^{12}_6\text{C}$	6	6	12
	$^{14}_6\text{C}$	6	8	14
chlorine	$^{35}_{17}\text{Cl}$	17	18	35
	$^{37}_{17}\text{Cl}$	17	20	37
hydrogen	^1_1H	1	0	1
deuterium	^2_1H	1	1	2
tritium	^3_1H	1	2	3
oxygen	$^{16}_8\text{O}$	8	8	16
	$^{17}_8\text{O}$	8	9	17
	$^{18}_8\text{O}$	8	10	18

Identify, and state, **five** Chemistry concepts learners might learn from reading the passage? [10]

- (i) Construct three items/questions for a test (*no need for specification table*) worth 10 marks that you could use to assess learners understanding of the homework task. [8]
- (ii) Construct a marking guide for the test constructed for b)(i) above. [7]