

UNIVERSITY OF ESWATINI
FACULTY OF EDUCATION
DEPARTMENT OF CURRICULUM AND TEACHING
RE-SIT EXAMINATION PAPER

JULY 2019

Title of paper: Curriculum Studies in Chemistry II

Course number: CTE330 (B. Ed. III)

CTE530 (PGCE)

Time allowed: 3 hours

Instructions:

1. This paper contains FIVE questions.
2. Answer ANY FOUR Questions.
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**.

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

QUESTION 1

Study the 2019/2020 SGCSE Physical Science syllabus Topic C8.0 Chemical reactions shown below and then attend to the tasks given below it:

C8.0 Chemical reactions
All learners should be able to:
C8.1 Production of energy <ol style="list-style-type: none">1. describe the use of hydrogen as a fuel e.g. in rockets2. describe the use of uranium-235 as a source of energy3. describe the production of electrical energy from simple cells i.e. two electrodes in an electrolyte (this should be linked with the reactivity series)
C8.2 Energetics of a reaction <ol style="list-style-type: none">1. describe, using examples, exothermic and endothermic reactions2. describe bond breaking as endothermic and bond formation as exothermic3. perform an experiment to measure the energy released in combustion of fuels (e.g. ethanol) and foods (e.g. peanuts) with associated calculations to find the energy released per unit mass using the formula $q = mc\Delta T$
C8.3 Speed of reaction <ol style="list-style-type: none">1. define speed of a reaction2. define a catalyst3. classify catalysts into inorganic and organic (enzymes) catalysts4. investigate the effect of concentration, particle size, catalysts (including enzymes) and temperature on the speed of reactions5. plot graphs and interpret data obtained from experiments concerned with speed of reaction6. explain the effect of concentration, particle size, catalysts (including enzyme) and temperature on the speed of reactions in terms of the collision theory7. 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
C8.4 Redox <ol style="list-style-type: none">1. define oxidation and reduction in terms of oxygen/hydrogen gain/loss2. define oxidation and reduction in terms of electron transfer limited to the formation of binary compounds3. identify redox reactions4. show awareness that light can provide energy needed for certain chemical reactions by:<ul style="list-style-type: none">• describing the use of silver salts in photography i.e. reduction of silver ions to silver• stating that photosynthesis leads to the production of glucose from carbon dioxide and water in the presence of chlorophyll and sunlight (energy)

- a) Suggest and justify a teaching sequence for the subtopics from the given topic. [7]
- b) Besides *sequencing*, discuss **three** other strategies a chemistry teacher may use to promote learner understanding of chemistry concepts during chemistry lessons from any section of the given topic. Use **relevant** examples for each strategy to support your response. [18]

QUESTION 2

The passage below is an introduction to a practical activity that pupils in a Form 4 class might be engaged in. Read the passage and then answer the questions that follow the passage.

Effect of temperature on the rate of a chemical reaction

A chemical reaction only occurs when atoms or molecules of the reactants are in contact. Thus, the speed of a given reaction will depend on the frequency with which the reacting particles collide. Not all collisions result in a chemical reaction, however, because they do not meet the energy requirements for the reaction or, in some cases, molecules are not properly aligned for the reaction.

Any change in the reaction condition that will increase the number of collisions (or the violence of the collision) between the particles will result in increasing the rate of the reaction.

- a) What pre-requisite concepts should pupils have developed to be able to understand the passage? [5]
- b) What key concepts might pupils learn from the above passage? [6]
- c) What difficulties might pupils experience in understanding the passage given above? [4]
- d) Describe, with the aid of an activity, how you might teach any **one** of the concepts noted in (b) above, to promote pupils' understanding of the concept and the passage. [10]

QUESTION 3

- a) Some pupils attribute properties of substances to the particles (atoms and molecules) when explaining the observed behaviour of matter. For example, "*sugar molecules dissolve in water*", "*water molecules melt when ice melts*".
 - i) How might misconceptions about matter (such as the ones shown here) arise? [3]
 - ii) How might a chemistry teacher help pupils realise that particles of matter do not dissolve or melt. [6]
- b) Describe **five** benefits of preparing a scheme of work prior to embarking on chemistry teaching. [10]
- c) What is the significance of the following in lesson planning:
 - i) Lesson introduction? [3]
 - ii) Lesson conclusion? [3]

QUESTION 4

- a) Acker and Otley (1993) note in their article “Gender issues in education for Science and Technology: Current situation and prospects for change” that a lot has been published on gender and education but of interest is *gender equity in education for science and technology and ... features of educational innovation and teachers work* that attempt to achieve such equity.
- i) Why is there a need for gender equity in education for science and technology? [6]
- ii) How might school chemistry teachers contribute to low gender equity in science? [9]
- b) For the 2019/2020 SGCSE Physical Science syllabus *Topic C8.0 Chemical reactions* given in QUESTION 1 above: identify content that reflects the relevance of the topic to the society. [10]

QUESTION 5

- a) “... In the last decades the consideration of the role of language for learning chemistry has changed dramatically. Today, language *in teaching and learning* is ... considered to be one of the central issues that fosters or hinders learning in general, and in the chemistry classroom in particular.” (Markic, Broggy & Childs, 2013:128)
(modification by examiner).
- Show clearly how language fosters chemistry learning in the chemistry classroom? [9]
- b) What teacher and learner language factors hinder learning in chemistry classrooms? [7]
- c) What justifications are used for the continued use of English as a language of instruction despite the numerous learning problems experienced in chemistry classroom in Eswatini? [8]