UNIVERSITY OF ESWATINI

FACULTY OF EDUCATION

DEPARTMENT OF CURRICULUM AND TEACHING

RE-SIT EXAMINATION PAPER

B. Ed. III/PGCE

January 2019

Course number: CTE329/CTE529

Title of paper: Curriculum Studies in Chemistry

Time allowed: 3 hours

Instructions:

1. This paper contains FIVE questions on FOUR Pages.
2. You may choose and 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.
6. **Read the instructions provided in each question.**

Special Requirements

Sheet A **Information Sheet (Attached to question paper)**

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

QUESTION 1

This question is compulsory

Use the SGCSE Physical Science syllabus section provided in Table 1 below, and the information attached as **Sheet A,** to respond to the tasks given below.

Table 1: SGCSE Physical Science Syllabus section

Sub-topic	***Core*** *All students should be able to*
7.1 Production of energy	*-describe the production of electrical energy from simple cells i.e. two electrodes in an electrolyte (this could be linked with the reactivity series)*

a) Write **three** properly constructed learning outcome for **a lesson** from this sub- topic. Objectives should include the different demands. [6]

b) Outline a plan for a practical activity you could run to attain the learning outcomes stated in (a) above. [8]

c) Indicate the **scientific knowledge, processes of science** and **manipulative abilities** you would expect students to develop from engaging in the practical activity outline in (b) above. [5]

d) Construct **three** questions or items you could use after the lesson to check for understanding. [6]

QUESTION 2

a) Teachers are usually advised to allow for "wait time" when using questions in teaching. What does "wait time" mean and what is its value in teaching and learning? [6]

b) What strategies might a teacher use to handle pupils' responses when using the question and answer method of teaching? [7]

c) Teachers need to take certain precautions when using practical work. State, and justify, **four** precautions that a teacher may need to take when teaching when using practical work to teach chemistry. [12]

QUESTION 3

a) Debates on the nature of science indicate that science may be viewed as a "body of stable but tentative knowledge, as well as a process of inquiry".

Discuss this statement and briefly indicate its implications for teaching science. [10]

b) Science is considered an important subject that all pupils in schools should study. Discuss **three** reasons why the study of chemistry should be part of the school curriculum. [13]

QUESTION 4

a) Improvisations are an important in strategies for acquiring resources for teaching chemistry.

i) With the aid of example(s) show what do you understand by improvisation of resources for teaching chemistry? [6]

ii) What are the requirements for effective improvisation? [9]

b) Teachers often complain about pupils' lack of chemistry textbooks.

State, and explain, **FIVE** factors that may contribute to lack of interest in buying of chemistry textbooks by pupils. [10]

QUESTION 5

The question and answer method is a versatile technique in teaching as it complements most of the other methods of teaching. Questions used in the question and answer method may be classified as **convergent, divergent** or **evaluative**.

a) What is your understanding of the question and answer method of teaching? [2]

b) Describe the characteristics of each of the three classes of questions mentioned in 5(a) and give **two** examples for each from Chemistry. [23]

isotope is enriched 2–3 % to achieve sufficient fission. Natural uranium contains 99.3% $^{235}_{92}U$ and 0.7% $^{235}_{92}U$. The world price for yellowcake has plummeted. This is partly due to the end of the cold war but also because very few new nuclear fission plants are being built, and they are mostly in the East. No new construction has happened in North America in over a decade and some nuclear plants that were under construction have been refitted to use fossil fuels.

The problems occurring at Chernobyl, the expense of nuclear construction vs. fossil fuel plants as well as the still unresolved issues of how to deal with the waste materials has dimmed the future of nuclear power.

Production of energy from electric cells

When two different metals are placed into an **electrolyte** (which is a solution that conducts electricity), a flow of electrons occurs due to the difference in reactivity between the two metals. Electrons flow from the more reactive metal to the less reactive metal. Refer to the chapter on metals for the reactivity series.

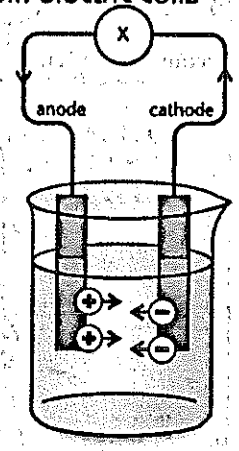

Figure 8 A simple electrolytic cell

When the metals are connected through an external circuit, for example a light bulb, a potential difference is created which causes a flow of electrons, or electric current, in the external circuit.

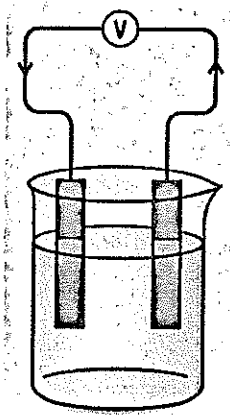

Figure 9 A simple electrolytic cell connected to a voltmeter

The more reactive metal is the source of the electrons as the atoms are oxidized in the process, while the less reactive metal forms the positive terminal, or cathode, of the cell. In the standard zinc-carbon or **Leclanché cell**, the more reactive zinc metal forms the anode or negative terminal, while the carbon rod, usually in the centre surrounded by the electrolyte in the form of a black paste, commonly of manganese(IV) oxide, forms the cathode which is reduced in the process.

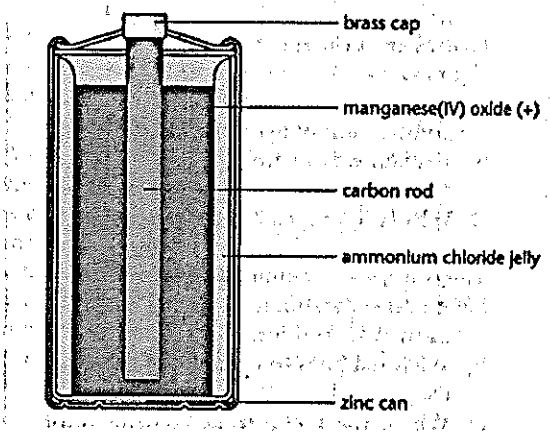

Figure 10 Labelled diagram of a dry cell

The voltage that can be supplied by the cell depends mainly on two factors, firstly, the difference in reactivity between the metals in the cell and secondly, the ability of the electrolyte to dissociate into ions in solution. The best electrolytes are strong acids, e.g. sulphuric, hydrochloric and nitric acids, and soluble salts, as they split up completely into ions in solution. The weak acids, e.g. ethanoic acid only split up partially and make poorer electrolytes.

Activity 2

A Galvanic cell

You will need:
A beaker; a sensitive voltmeter; connecting leads; different concentrations of hydrochloric acid, from very dilute to slightly dilute; a strip of copper; a strip of zinc rod; several strips of magnesium

Do the following:
1. Pour the acid with the lowest concentration into the beaker.