UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION
FINAL EXAMINATION PAPER 2006

B. Ed. II AND PGCE F/T

TITLE OF PAPER : Curriculum Studies in Chemistry

COURSE NUMBER : EDC 279

TIME ALLOWED Three (3) hours

INSTRUCTIONS

1. This paper contains five questions
2. Question 1 is COMPULSORY. You may then choose ANY THREE questions from questions 2, 3, 4, 5
3. Each question is worth 25 mark
4. Any piece of material or work which is not intended for marking purposes should be clearly CROSSED OUT

2. Ensure that responses to questions are NUMBERED CORRECTLY

SPECIAL REQUIREMENTS

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

QUESTION 1

Read the information in Boxes 1, 2, and 3. Answer the questions that follow.

BOX 1 Aristotle on elements and burning

Aristotle was a Greek teacher who lived 2 300 years ago.
He was the teacher of Alexander the Great. Aristotle studied nature and developed ideas about natural processes. One of the natural processes he studied was burning.

Aristotle's theory was that all matter was made up of a mixture of three elements. The elements were Earth, Water and Air.
Different materials contained different proportions of Earth, Water and Air, and this is what gave the materials different properties.
Fire, a fourth element, could be used to combine or separate the Earth, Air and Water.
Aristotle argued that when something burnt the Air was liberated upwards as smoke and the Earth fell downwards as ash.

BOX 2 Stahl and the phlogiston theory

Georg Stahl was a German doctor who helped patients who were mentally disturbed.
He was also interested in what happened when things burnt.

Stahl developed his theory of burning in the closing years of the seventeenth century.
He thought when things burn they give out a substance called phlogiston.
Things that burnt brightly and fiercely contained a lot of phlogiston.
Things burnt slowly, or not at all, contained little or no phlogiston.

In support of his theory, Stahl was able to point to how what burnt was quite different to what was left after burning.
Generally, things did weigh less after burning than they did before.

BOX 3 Antoine Lavoisier, burning in oxygen

Antoine Lavoisier was a French tax collector who lived between 1743 and 1794.
He studied what happened when metals were burnt.

From his careful experiments he confirmed that when metals burnt their mass increased.

Lavoisier's theory was that matter is made up of many different elements not Earth, Water, Air and Fire. One of these elements was oxygen.
Lavoisier suggested that elements combine in different ways to make new substances.
When something burns, oxygen combines with the other elements in the substance to form oxides. Sometimes the oxides are solids - as with metals.
Sometimes the oxides are gases - as with carbon dioxide and sulphur dioxide.
During the French Revolution Lavoisier was executed by guillotine in 1794.

The three boxes above show the development of ideas about the process of burning through different periods of our civilization.

a. Why would it be important for the teacher to introduce learners to this history of ideas about burning? [5]
b. Why is phlogiston not considered in modern Chemistry? [5]
c. Evaluate the critical learning point in tracing the history of ideas about burning [5]
d. Write a short factual history that could be used to introduce study of the structure of the atom. [10]

QUESTION 2

a. Using **two** examples from chemistry, in each case, describe what is meant by each of the following terms:

i. scientific fact

ii. scientific principle

iii. scientific theory [9]

b. Give specific instances of class activities in chemistry (practical or otherwise) which can be used to develop the following:

i. ability to communicate [3]

ii. manipulative skills [3]

iii. accuracy and precision as attitudes relevant of science [3]

c. Using your knowledge of multiple choice items,
i. indicate **three** limitations of the items presented below: [3]

A piece of calcium metal is dropped in water.
A solution is formed and a gas is given off.

31. The gas that is given off
A. turns lime water milky
B. rekindles a glowing splint
C. explodes with a "pop" sound in the presence of a lighted splint
D. extinguishes a flame

32. The solution that is formed
A. turns litmus paper red
B. turns litmus paper blue
C. turns litmus paper yellow
D. has no effect on litmus paper

ii. Reconstruct the items to eliminate the limitations identified [4]

QUESTION 3

a. What is the importance of well stated instructional objectives in lessons? [5]

b. The introduction and the conclusion have important functions in a lesson. Discuss the function served by each one of the two in a lesson? [12]

c. Using appropriate examples outline the limitations of behavioral objectives. [8]

QUESTION 4

a. Motivation reflects attitude development and is all too important in the teaching and learning process to be left to chance. Why is motivation important for learning? [3]

b. The following factors are considered to affect motivation for learning chemistry

   i) basic human needs

   ii) future employment

   iii) teacher

   Describe how each of these factors might affect motivation. [21]

QUESTION 5

In recent years curriculum development has put emphasis on relevance of science curricula.

a. What is your understanding of "relevance of science curricula"? [5]

b. Why is the concept of "relevance" necessary in science education? [5]

c. How could a teacher use pupils' views of the importance of science in developing concepts? [5]

d. Identify a topic of your choice from the IGCSE syllabus and discuss the extent to which you consider the topic to be relevant to Swaziland. [10]