

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES

DIPLOMA IN ENVIRONMENTAL HEALTH SCIENCE

SUPPLEMENTARY EXAMINATION PAPER 2005

TITLE OF PAPER	INTEGRATED BASIC SCIENCES
COURSE CODE	HSC 103
TIME	3 HRS
MARKS	100
INSTRUCTIONS	<p>ANSWER <u>FIVE (5)</u> QUESTIONS ONLY</p> <p>EACH QUESTION IS WORTH 20 MARKS</p> <p>AT LEAST TWO (2) QUESTIONS MUST BE ANSWERED FROM EACH OF SECTIONS A AND SECTION B</p> <p>NO FORM OF ANY PAPER SHOULD BE BROUGHT INTO OR TAKEN OUT OF THE EXAMINATION ROOM</p> <p>BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF ANSWER PAPER</p> <p>ALL CALCULATIONS / WORKOUT DETAILS SHOULD BE SUBMITTED WITH YOUR ANSWER SHEET</p>

DO NOT OPEN THIS EXAMINATION PAPER UNTIL PERMISSION TO DO SO IS GRANTED BY THE INVIGILATOR.

SECTION A

ANSWER AT LEAST TWO QUESTIONS FROM THIS SECTION

QUESTION 1 20 MARKS

A. Express the data below as:

Exponential numbers (i) 0.0000507 (ii) 416.5 (2,2)

Common numbers: (iii) 2.2×10^4 (iv) 5.11×10^6 (v) 7.21×10^{-5} (2,2,2)

B. Work out the number of **significant figures** for the following measurements:

(i) 0.013L (ii) 1500ml (2,2)

C. Perform the following mathematical calculations, and give your answer to the **CORRECT** number of significant figures:

(i) $10.1\text{mL} - 0.20\text{mL}$ (ii) $4.973\text{g} \div 5\text{mL}$ (3, 3)

QUESTION 2 20 MARKS

Explain what the following terms mean and give one example for each: (5 marks each)

- (a) "Mixtures".
- (b) "Elements"
- (c) "Physical property".
- (d) "Compounds".

QUESTION 3 20 MARKS

- (i) Calculate the molecular formula of $\text{Ca}_3(\text{PO}_4)_2$. (3,4, 4)
- (ii) Calculate the percentage composition of each of the components. (9)

QUESTION 4 20 MARKS

A.

- (i) What is the main organic acid component in medications that are normally used for the treatment of fungal infections?
- (ii) What is class of hydrocarbons are commonly used as germicides for disinfecting excreta?
- (iii) What are the compounds which are commonly used as solvents of fats and oils and are useful in the diagnosis of diabetes? (6)

B. (i) Describe Heterocyclic hydrocarbons.

- (ii) How else are Aromatic hydrocarbons known as? (4)

C. (i) Discuss "plant nutrients" in the context of pollution.

(4)

- (ii) Distinguish - according to the buffer systems involved - the **extracellular** electrolyte profile and the **intracellular** electrolyte profile. (6)

SECTION B

ANSWER AT LEAST TWO QUESTIONS FROM THIS SECTION

QUESTION 5 20 MARKS

Explain each of the following concepts by discussing one example - that is related to your area of study - that clearly demonstrates your understanding of each of the following concepts.

Adhesion:

Cohesion:

Gels:

Diffusion:

QUESTION 6 20 MARKS

Discuss (i) Charles' law and (ii) Henry's law.

Your discussion should include what variables are involved and how these are related. (4 marks each)

Show the relationship of the variables in an equation format. (4 marks each)

Think and give one example in each case - an example that has not been used to illustrate the concept to you in class or assessments. (2 marks each)

QUESTION 7 20 MARKS

- A. What is meant by “machines” in the physics context. (5)
- B. Specify the known classes of machines and give one (1) example that is related to the field of health to illustrate each class of machines that you discuss. (15)

QUESTION 8 20 MARKS

- A. Discuss the three types of rays, (2 marks each)
- mentioning the common source(s) for each type (2 marks each), as well as
- the impact each type of rays has on our bodies. (2 marks each)
(Total: 18 marks)
- (e) How do Television and radio waves differ from X -rays? (2)