UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science

BACHELOR OF SCIENCE DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

FINAL EXAMINATION DECEMBER 2016

TITLE OF PAPER	:	**ENVIRONMENTAL TOXICOLOGY**
COURSE CODE	:	**EHM 314**
DURATION	:	**2 HOURS**
MARKS	:	**100**

INSTRUCTIONS

1. **Question 1 is compulsory**
2. **Read the questions & instructions carefully**
3. **Then answer ANY OTHER FOUR (4) questions**
4. **Each question is weighted 25 marks**
5. **Write neatly and clearly**
6. **Begin each question in a separate sheet of paper**
7. **Numbering within a chosen question should be in a sequential order**
8. **BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.**

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1

A. Write the word from the list below that best completes the statement. There are more words than the statements and some words can be used more than once or none at all. (20 marks)

Descriptive toxicologist Potentiation Vinyl chloride Local toxicity Necrosis Dose Hypersensitivity Apoptosis Lysosomes Environmental toxicologist Birth defects Mitosis LD_{50}/ED_{50} Margin of safety Teratogen LD_{50} Bromobenzene

i. The dose at which half the test subjects are killed is denoted as _____.

ii. Their prime function is breaking down of cellular waste substances _____.

iii. The therapeutic Index is usually defined as _____.

iv. _____ occurs when an inactive substance enhances action of an active one.

v. _____ is the most important factor that determines the toxicity of a chemical.

vi. A chemical that can cause birth defects to an unborn fetous is called _____.

vii. _____ is the difference between the effective and lethal dose of toxic substances employed for useful purposes like in pharmaceuticals.

viii. _____ is concerned with gathering toxicological information from animal experimentation.

ix. A scientist who is concerned about the movement of chemicals in the environment _____.

x. _____ a compound that causes liver cancer whilst _____ causes liver necrosis.

B. The absorption of a toxicant in the lungs is dependent on the particle size of the toxicant. Do you agree with this statement and why? (5 marks)

QUESTION 2

A. A worker returned after 2 hours from having lunch only to find a friend in the room having passed out on a chair near an oil burning stove. The friend called management and they took her outside to let her breath fresh air. The friend insisted on calling an ambulance but the management did not want to alarm anyone and said that was unnecessary.

i. What type of gas do you think was involved here? (2 marks)

ii. Who was right in this scenario and why? Explain your answer with a diagram. (8 marks)

B. Briefly indicate the unique features of the following systems that make them vulnerable to toxic insults (15 marks)

i. Blood Brain Barrier

ii. Blood Placenta Barrier

iii. Blood Testis Barrier.

QUESTION 3

a) What was the story of Thalidomide during the evolution of toxicology? (5 marks)

b) Explain the **first pass metabolism** and why this form of elimination results in low level of expression of toxicity in the body? (5 marks)

c) Outline how the following compromise the functioning of the body and indicate the body parts that are mostly affected. (8 marks)

i. Neurotoxins
ii. Heavy metals
iii. Anesthetics and chlorinated hydrocarbons
iv. Organophosphates

d) The Stockholm Convention on Persistent Organic Pollutants (POPs) targeted 12 POPs for elimination and eight (8) of these are pesticides. Name only five (5) of these. (5 marks)

e) Why does DDT become less toxic at higher water temperatures in fish? (2 marks).

QUESTION 4

a) Describe the dose-response curve and its assumptions? (5 marks)

b) Define threshold and explain its significance in establishing toxicity (3 mark)

c) Discuss the generalized dose-response curve's 3 distinct regions (9 marks)

d) Define the objective of toxicity testing (8 marks)

QUESTION 5

a) Define a completed exposure pathway to xenobiotics and list the components thereof. (10 marks)

b) Differentiate between an exposure and a dose. (4 marks)

c) Discuss the factors that determine toxicity in test animals. (4 marks)

d) Test animals may be exposed to the same chemicals and yet some of them may not develop a response to that particular chemical, what do we call this response? (3 marks)

e) Name the two factors that the collapse or gentle rebound of the ecosystem is dependent on if it has been exposed to a disruptive toxicant. (4 marks)