



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

**BACHELOR OF SCIENCE DEGREE IN ENVIRONMENTAL  
HEALTH SCIENCE**

**SUPPLEMENTARY EXAM JULY 2017**

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

**INSTRUCTIONS**

- 1. Read the questions & instructions carefully**
- 2. Then answer ANY OTHER FOUR (4) questions**
- 3. Each question is weighted 25 marks**
- 4. Write neatly and clearly**
- 5. Begin each question in a separate sheet of paper**
- 6. Numbering within a chosen question should be in a sequential order**
- 7. 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) You are an Environmentalist based at Nsenga Royal Kraal. Every Saturday when you attend community meetings, the residents complain of a compound that is affecting them after they have drunk water. as environmental toxicologist how will you go about in solving this predicament? (10 marks)
- b) What is the theorized shape of a dose – response curve, and what are its assumptions? (5 marks)
- c) Name the type of toxicity that is likely to be caused by the following chemicals (6 marks)
- i. Bromobenzene
  - ii. Vinyl chloride
  - iii. Aniline
  - iv. Dimethylnitrosamine
  - v. Carbon tetrachloride
  - vi. Chloroform
- d) Toxicants undergo certain processes in the body. Clearly explain the following processes. (4 marks)
- i. Disposition
  - ii. Distribution

**QUESTION 2**

- a) What is/are the functions of the Endoplasmic Reticulum? (5 marks)
- b) Outline the questions that a Health Risk Assessor may address under hazard identification in order to implicate a certain xenobiotic to an adverse effect (8 marks)
- c) Differentiate between the following (8 marks)
- i. Toxicant and a toxin
  - ii. A completed exposure pathway and a multi–pathway exposure
  - iii. Critical path and a critical group –
  - iv. Immediate toxicity vs delayed toxicity –
- d) Write formulae for the following (4 marks)
- i. Therapeutic Index and

## ii. The Margin of Safety

**QUESTION 3**

- a) With an aid of a diagram discuss what you understand by endocytosis and exocytosis (10 marks)
- b) The bio-magnification of chlorinated hydrocarbons has led to eco-toxicological imbalances that have been observed in birds of prey. What have these effects been? (6 marks)
- c) Define hydrolysis as it relates to phases of xenobiotic reactions (1 mark)
- d) What use may be made of the following? (4 marks)
- a. Birds of prey and
  - b. Lichens in monitoring?
- e) Is there a difference between the toxicity and hazard of a substance? If so, explain the difference. (4 marks)

**QUESTION 4**

- a) What are some of the factors that MAY determine how hazardous a chemical is? (7 marks)
- b) What signal word(s) are required on the label for pesticides classified as: highly toxic, moderately toxic, slightly toxic, practically non - toxic? e.g. highly toxic = Mamelodi Sundowns (8 marks)
- c) Match the following with the relevant contributor in the milestone of toxicology using numbers and letters only e.g. 13 = Z (10 marks).

1. Cleopatra	a. Experimented with bioaccumulation of poisons in animals
2. Hippocrates	b. Described symptoms of poisons in 1813, considered father of modern toxicology
3. Percival Pott	c. 40, 000 dead from eating contaminated wheat
4. Socrates	d. Tested antidotes to poison himself and prisoners
5. Mateu J.B. Orfila	e. Founder of modern medicine, named cancer after creeping crab.
6. Catherine Medici	f. Experimented with strychnine & other poisons on prisoners and the poor
7. Paul Muller	g. Recognized coal – tar caused cancer of scrotum
8. Mithridate IV	h. Died by hemlock – active chemical alkaloid
9. Ergot outbreak	i. Swiss who recognized DDT as insecticide in 1939
10. Leonardo de Vinci	j. Queen of France, tested poison on the poor & sick

**QUESTION 5**

- a) Differentiate between a RfD and a benchmark dose (6 marks)
- b) Write the formulae for the following as they relate to toxicology (10 marks)
  - i. Exposure
  - ii. Average Daily Dose
  - iii. Lifetime Average Daily Dose
  - iv. Margin of Safety
  - v. Therapeutic Index
- c) "There are no harmless substances. There are only harmless ways of using substances". Who is famous for making this statement? Do you agree with his assertion and why? (6 marks)
- d) What do you understand by acute and sub – acute exposures? (3 marks)