



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

BACHELOR OF SCIENCE IN ENVIRONMENTAL
MANAGEMENT AND OCCUPATIONAL HEALTH

DECEMBER 2017 FINAL EXAMINATION PAPER

TITLE OF PAPER : ENVIRONMENTAL TOXICOLOGY
COURSE CODE : EHS 313
DURATION : 2 HOURS
MARKS : 100

INSTRUCTIONS

1. Read the questions & instructions carefully
2. Write your area of specialization on top of your answer sheet
3. Question 1 is compulsory
4. Then answer ANY OTHER THREE (3) questions
5. Each question is weighted 25 marks
6. Write neatly and clearly
7. Begin each question in a separate sheet of paper
8. Numbering within a chosen question should be in a sequential order
9. 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) Match the following people or events with the relevant milestone of toxicology using numbers and letters only e.g. 13 = Z (20 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

- b) What is the story behind thalidomide? (3 marks).
 c) Acute oral toxicity and acute dermal toxicity are measured in LD₅₀. The higher the LD₅₀ the _____ (more or less) toxic the pesticide (2 marks).

TOTAL [25 MARKS]

QUESTION 2

- a) What is the significance of these times in the following labels? (12 marks).
 > TWA – 8 hrs – 40 hrs – 8 hrs
 > STEL – 15min – 4 – 60 min.
 b) Outline the interrelationship between PELs and TLVs (6 marks).
 c) Outline how toxic concentrations values differ from any other exposure values? (2 marks).
 d) List the procedures that manufactures and inspectors from environmental agencies can establish in order to ensure authenticity of data collection. (5 marks).

TOTAL [25 MARKS]

QUESTION 3

- a) When dealing with EPA inspectors, they audit the accuracy and integrity of data. What do they normally check about the employees? (3 marks).
- b) Contrast lethal values with lethal concentration values (4 marks).
- c) List four types of poisoning that can be classified under acute poisoning (4 marks).
- d) Name the dose that is analogous to the RfD (2 marks).
- e) Differentiate the following responses to chemicals (2 marks).
 - i. Tolerance
 - ii. Dispositional tolerance
- f) As an environmental toxicologist how will you go about solving a diarrheal complaint apart from research in affected community? (10 marks).

TOTAL [25 MARKS]

QUESTION 4

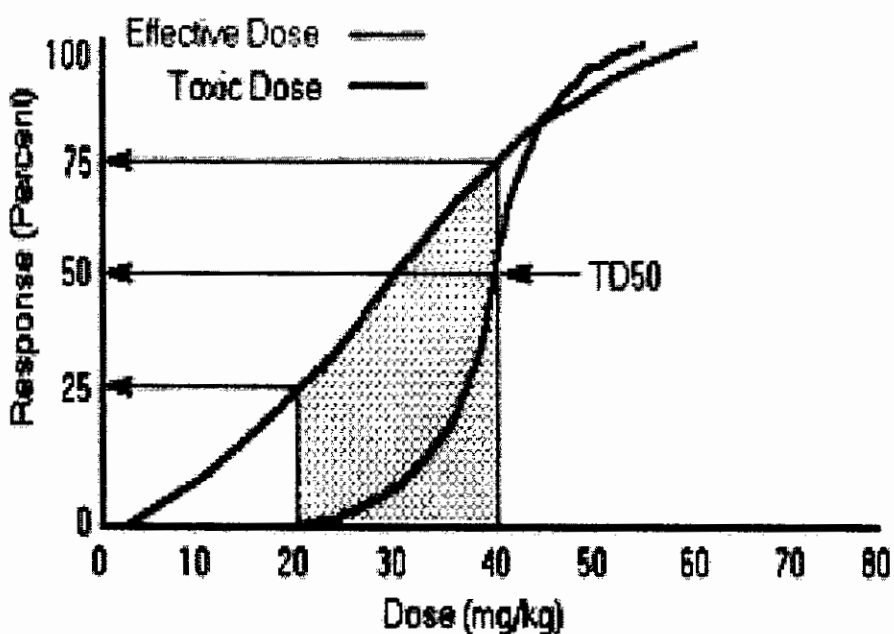
- a) Assuming that a person who lives at Mbabane Campus is exposed daily to arsenic concentration in drinking water of 0.35 mg/L. Intake rate is 2L and 1L for adult and child respectively.
 - i. What is the ADD for an adult living in this area? (2 marks).
 - ii. ADD for a child living with his parents? (2 marks).
 - iii. What is the LADD for an adult exposed daily? (2 marks).
- b) Just name the type of chemical that is likely to cause the following diseases (6 marks).
 - i. Liver necrosis
 - ii. Liver cancer
 - iii. Methemoglobinemia
 - iv. Carcinogenesis
 - v. Liver necrosis
 - vi. Renal necrosis.

- c) Your campus has hired you as a technician in their Toxicology laboratory. You have to receive some animals that will be used in testing some chemicals. What will your housing conditions be so that you do not adulterate the results thereof? (10 marks).
- d) What are the 3 distinct regions of the dose – response curve? (3 marks).

TOTAL [25 MARKS]

QUESTION 5

- a) Discuss the therapeutic index using the figure below (10 marks).



- b) Write formulae for the following.
- i. Therapeutic Index and (3 marks).
 - ii. The Margin of Safety (3 marks).
- c) What use may be made of the following? (4 marks).
- i. Birds of prey and
 - ii. Lichens in monitoring?
- d) Is there a difference between the toxicity and hazardousness of a substance? If so, explain the difference (4 marks).
- e) Is a highly toxic material always very hazardous? (1 mark).

TOTAL [25 MARKS]