



UNIVERSITY OF SWAZILAND

Faculty of Health Science

Department of Environmental Health Sciences

Main Examination 2011

Title of paper: INTRODUCTION TO TOXICOLOGY I

Course code: EHS 560

Time allowed: 2 HOURS

Marks allocation: 100 Marks

Instructions:

- 1) Question 1 is compulsory**
- 2) Answer ANY THREE (3) questions**
- 3) Each question is weighted 25 marks**
- 4) Write neatly and clearly**
- 5) Begin each question on a separate sheet of paper**

This paper is not to be opened until the invigilator has granted permission

QUESTION 1

- a) Match the following with the relevant contributor in the milestone of toxicology using numbers and letters only e.g. 13 = Z (20).

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)
c) In the milestone of toxicology, who were the 2 women who were trading with arsenic and what were their intentions about this trade? (2)

QUESTION 2

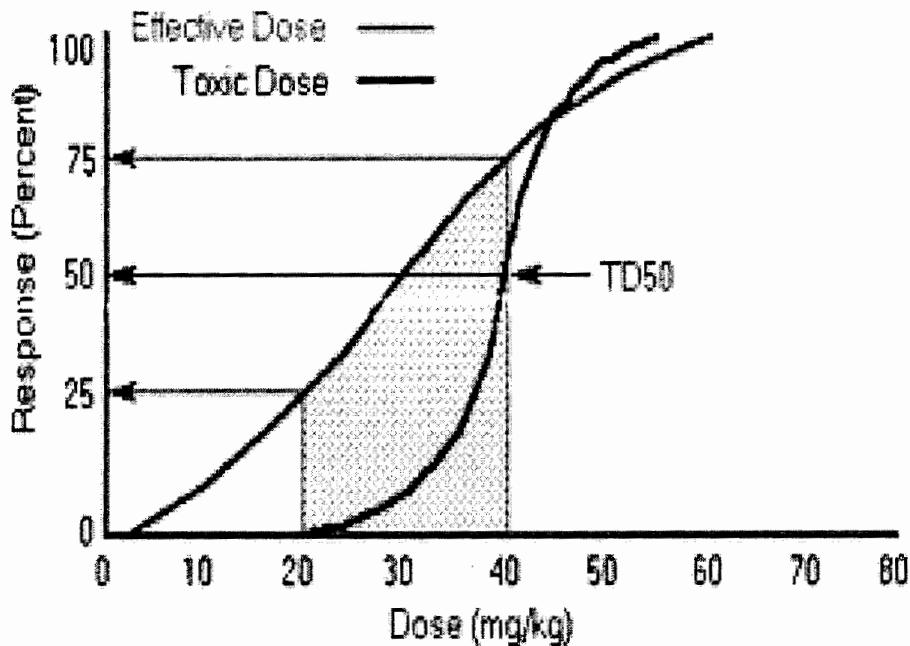
- a) Differentiate between the following (8)
i. Toxicant and a toxin
ii. A completed exposure pathway and a multi-pathway exposure
iii. Critical path and a critical group
iv. Immediate toxicity vs delayed toxicity
b) With an aid of a diagram discuss what you understand by endocytosis and exocytosis (10)
c) The biomagnification of chlorinated hydrocarbons has led to ecotoxicological imbalances that have been observed in birds of prey. What have these effects been? (6)
d) Define hydrolysis as it relates to phases of xenobiotic reactions (1)

QUESTION 3

- a) 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)
- b) What are the 3 distinct regions of the dose – response curve? (6)
- c) Write formulae for the following (6)
 - i. Therapeutic Index and
 - ii. The Margin of Safety
- d) Name the 3 main routes of exposure to chemicals by humans (3)

QUESTION 4

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



- b) Why is a bird used as an example of a vertebrate model for toxicity testing? (7)
- c) 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)

QUESTION 5

- a) Acute oral toxicity and acute dermal toxicity are measured in LD₅₀. The higher the LD₅₀ the _____ (more or less) toxic the pesticide. (2)
- b) Name and describe 6 different ways that pesticides can be toxic to humans (6)
- c) What use may be made of the following? (4)
 - (i) Birds of prey and
 - (ii) Lichens in monitoring?
- d) Is there a difference between the toxicity and hazard of a substance? If so, explain the difference. (4)
- e) Is a highly toxic material always very hazardous? (2)
- f) What are some of the factors that determine the hazard of a chemical? (7)