UNIVERSITY OF SWAZILAND

Faculty of Health Science

Department of Environmental Health Sciences

Main Examination

2014 December

Title of paper: INTRODUCTION TO TOXICIOLOGY I

Course code: EHS 560

Time allowed: 2 HOURS

Marks allocation: 100 Marks

Instructions:

1) Answer ANY FOUR (4) questions
2) Each question is weighted 25 marks
3) Write neatly and clearly
4) 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) Briefly describe a completed exposure pathway that people may be subjected to (7)
b) Write short notes on exposure (9)
c) Define passive transfer and what determines it (5)
d) You were investigating toxicity amongst an exposed population, what are the factors the possible factors that you would be looking for? (4)

QUESTION 2

a) What is the route of elimination of the following compounds? (5)
   i. Volatile compound
   ii. Very low molecular compounds
   iii. Both water and lipid soluble compounds
   iv. Major route for low molecular weight polar compounds
b) What is the importance of the plasma membrane and indicate the type of substances that it allows to enter and leave the cell? (8)
c) There are two important chemicals that keep the cell functional, which are they and what is their importance? (5)
d) Acute oral toxicity and acute dermal toxicity are both measured in LD_{50}. The higher the LD50 the _____ (more or less) toxic the pesticide (1)
e) Define the following terms and indicate why toxicologist carry it out (6)
   - Lavage
   - Gavage
   - Potency

QUESTION 3

a) If the LC_{50} is 70, LD_{50} is 200 and the ED_{50} is 20, what will the Therapeutic Index be? (2)
b) You have been assigned to conduct a laboratory investigation by your company. One chemical has a TI of 4 and the other a TI of 7, out of the 2, which one will you prefer and why? (4)
c) Briefly write short notes on the use of thalidomide during the evolution of toxicology (3)
d) What are the effects observed in birds of prey caused by chlorinated hydrocarbons that have led to ecotoxicological imbalances? (6)

e) If you have to receive some animals that will be used in testing some chemicals in your campus, list the housing conditions that you have to thoroughly monitor so that you do not adulterate the results thereof (10)

QUESTION 4

a) Write briefly on the 3 distinct regions of the dose – response curve? (6)
b) Is a highly toxic material always very hazardous? (2)
c) Is there a difference between the toxicity and hazard of a substance? If so, explain the difference (4)
d) Sequentially indicate the level of toxicity rating category and labeling requirements for pesticides (8)
e) How can the hepatic enzymes inhibit the first pass effect? (3)
f) What is Threshold Limit Value of a chemical? (2)

QUESTION 5

a) What are the functions of the following proteins? (9)
    i. Carrier proteins
    ii. Ionophores
    iii. Transport proteins
b) Some chemicals have been banned from public use due to their know risks, however some countries like Swaziland are still using DDT. What are the factors considered in determining acceptable risk? (7)
c) Biomonitoring is a scientific technique for assessing human exposures to natural and synthetic chemicals, based on sampling and analysis of an individual's tissues and fluids. What are its drawbacks though? (6)
d) Name three barriers of toxicological importance (3)