



**UNIVERSITY OF SWAZILAND**

**Faculty of Health Science**

**Department of Environmental Health Sciences**

**December Main Examination 2013**

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**Title of paper: INTRODUCTION TO TOXICOLOGY I**

**Course code: EHM 314**

**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) Compare and contrast the following terms hormesis and Mithridatism (6)

b) Some of these assumptions are also applicable to the second bit of the question (14)

The following assumptions are made;

Concentration =  $28\text{mg}/\text{m}^3$ ,  $0.35\text{mg}/\text{L}$ , Body weight for adult =  $70\text{kg}$ , child =  $15\text{kg}$ . Intake rate =  $22\text{m}^3$  adult and  $15\text{m}^3$  for child. Lifetime = 55 years for adult and 10 years for a child.

In Matsapha, the average concentration of diesel fumes in the air is  $28\text{mg}/\text{m}^3$  in the 3 months of winter, but is it  $0\text{mg}/\text{m}^3$  during the rest of the year. Assume that everyone is exposed daily to diesel fumes in the air they breathe.

Calculate the following

- i. What is the ADD for an adult during winter?
- ii. ADD for a child during the same period?
- iii. What is the LADD for an adult living in Matsapha?
- iv. LADD for a child living in Matsapha?

Assuming that a person who lives in G/West 15026 is exposed daily to arsenic concentration in the drinking water of  $0.35\text{mg}/\text{L}$ . Intake rate is  $2\text{L}$  and  $1\text{L}$  for adult and child respectively.

- i. What is the ADD for an adult living in this area?
- ii. ADD for a child living with his parents?
- iii. What is the LADD for an adult exposed daily?

c) What are the functions of the Endoplasmic Reticulum? (5)

How will you go about as an environmental toxicologist in solving this predicament? (10)

- c) What is the theorized shape of a dose – response curve, and what are its assumptions? (5)

#### QUESTION 4

- a) The BTB is exposed to a different array of toxicological insult like Cadmium (Cd). However, there are some chemicals that can prevent Cd toxicity in this system, which are these chemicals? (4)
- b) Define a completed exposure pathway to xenobiotics and list the components thereof (10)
- c) List the 3 processes of Phase 1 xenobiotic reactions (3)
- d) Define critical path as it relates to biological monitoring (1)
- e) Discuss the factors that determine toxicity in test animals (4)
- f) Write briefly about the Chernobyl accident (3)

#### QUESTION 5

a) If 2 chemicals are mixed together they produce different reactions that can either be more potent or even less than the parent one. Explain the following reaction as they relate to toxicology (10)

- i. Antagonism
- ii. Synergism
- iii. Additivity
- iv. Potentiation
- v. Covalent bonding

b) Name the factors that affect absorption of toxicants through the dermal route (6)

c) Differentiate between an exposure and a dose (4)

d) Write short notes on the following terms (5)

- i. Tolerance,
- ii. RfD,
- iii. Biologically effective dose
- iv. Phagocytosis
- v. Endocytosis