



**UNIVERSITY OF SWAZILAND**

**Faculty of Health Science**

**Department of Environmental Health Sciences**

**Main Examination 2012**

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

**Course code: EHS 561**

**Time allowed: 2 HOURS**

**Marks allocation: 100 Marks**

**Examiner: M.V. Mamba**

**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) Define and write a formula for first order kinetics (5)**
- b) Bioavailability of toxicants to humans is subjected to three factors, yet it is 100% if applied intravenously. Name these 3 bioavailability dependants (6)**
- c) Differentiate between low and high intrinsic clearance (4)**
- d) Name the toxicokinetics that depict a typical graph course of a drug plasma concentration (8)**
- e) The brains of fetuses & children are particularly susceptible to neurotoxins because they are actively growing. What is the most common neurotoxin that children are exposed to on a daily basis? (2)**

### **QUESTION 2**

- a) Name the 2 important ions that help the nerves to communicate with other cells (4)**
- b) Write a formula for Rate of Elimination (RoE) (1)**
- c) The plasma membrane is able to allow some substances in and out of the cell, which are these substances that are normally allowed? (8)**
- d) What health effects are associated with Cadmium? (4)**
- e) Endocrine Disruptors (EDCs) have been widely studied and proven to cause disturbances in metabolism, growth, reproduction and stress response. Just write only the hormones that are impacted by EDCs in order to compromise these 4 normalities (8)**

### **QUESTION 3**

- a) The kidney is a key role player in ridding the blood system of toxicants that may harm an organism; however there are some toxicants that may compromise this organ in performing such an important task. Name 5 nephrotoxicants that may affect the kidney (5)**

- b) Poor nutrition is one of the modifiers of metabolism, what are the 3 deficiencies that can decrease the ability to synthesize biotransforming enzymes from taking place? (6)**
- c) Briefly discuss how elimination can modify the elimination of a toxicant in the body (4)**
- d) Name the 4 benchmarks that are used in calculating an ADI (4)**
- e) Scientist at times find it very difficult to agree on certain findings regarding some chemicals. What are the 3 main factors that are considered if one is to support the assertion that EDCs indeed cause some health effects to humans? (6)**

#### **QUESTION 4**

- a) Name the 3 types of biological markers and describe their individual functions in just one sentence each (6)**
- b) Write the different formulae for the following as they pertain to toxicology (10)**
  - i.  $V_d$**
  - ii. Biological half life**
  - iii. Concentration**
  - iv. Elimination rate**
  - v.  $C_{min}$**
- c) Briefly discuss 4 factors that contribute to drug distribution in the body (8)**
- d) What is the function of germ cells in reproductive toxicity? (1)**

## **QUESTION 5**

- a) What are the major organs of the Endocrine system and in just one sentence describe the function of each (9)**
- b) List possible human effects that are associated with EDCs exposure (10)**
- c) What are the dire consequences that can be attributed to systemic toxicity if one is considering nephrotoxicity? (6)**