

**UNIVERSITY OF SWAZILAND
SECOND SEMESTER FINAL EXAMINATION 2012**

TITLE OF PAPER : Special Topics in
Environmental/Analytical
Chemistry

COURSE NUMBER : C615

TIME : Three Hours

INSTRUCTIONS : Answer any FOUR
Questions. Each Question
carries 25 Marks.

This Paper contains four (4) pages.

***You must not open this paper until the Chief Invigilator
so has granted permission to do.***

SECTION A
ESSENTIALS OF ENVIRONMENTAL TOXICOLOGY AND
ECOTOXICOLOGY

Question 1

- (a) Explain the following term in relation to environment toxicology: (9 marks)
- i) Toxin
 - ii) Toxicity
 - iii) Venom
- (b) Outline the four distinct types of toxicity that characterize the duration and location of the poisonous state. (16 marks)

Question 2

- (a) Explain the terms toxicokinetics and toxicodynamics in relation to toxicity. (9 marks)
- (b) Describe a procedure for testing toxicity of a chemical substance in:
- (i) Earthworms (8 marks)
 - (ii) Bees (8 marks)

Question 3

Discuss factors that affect the distribution of toxic substances to tissues. (25 marks)

SECTION B
ENVIRONMENTAL LAW

Question 4[25]

- (a) In relation to the Environment Management Act 2002 of the Swaziland statutes,
- (i) Explain how international conventions have lead to the development of this legislation. (4 Marks)
 - (ii) Explain how the Environment Management Act 2002 has superceded the Swaziland Environmental Authority Act 1993. (4 Marks)
- (b) In relation to the Water Pollution Control Regulations of 2010,
- (i) Explain the “Polluter – Pays” principle, and how the Water Pollution Control Regulations of 2010 effects this principle. (4 Marks)
 - (ii) Explain the role of public participation fora on the processes that led to the gazetting of these regulations. (4 Marks)
- (c) Explain the procedures for handling spills in so far as the Water Pollution Control Regulations of 2010 is concerned. (4 Marks)
- (d) International treaties and conventions govern water usage and its quality for transboundary rivers.
- (i) Under which river basin authorities do the following fall:
 - Lusushwana River at Matsapha? (1 Mark)
 - Mlumati River in Matsamo? (1 Mark)
 - (ii) Briefly discuss the Inco Maputo Agreement in relation to the protocol on shared water courses between Swaziland, Mozambique and South Africa. (3 Marks)

Question 5[25]

- (a) In relation to the Swaziland Air Pollution Control Regulations of 1999,

- (i) Explain how international conventions have led to the development of this legislation. (4 Marks)
 - (ii) Explain how pulp mills have adopted emission controls to comply with this legislation. (4 Marks)
- (b) In relation to the Swaziland Ozone Regulations of 2003,
- (i) Discuss the international convention that led to these regulations. (4 Marks)
 - (ii) Describe the process that the Swaziland Environment Authority has undertaken to result in the gazetting of these regulations. (5 Marks)
- (c) In regard to ozone depleting substances (ODS),
- (i) List the ODS compounds that are being phased out in Swaziland and enforced by law. (2 Marks)
 - (ii) List the industries that are affected by this legal phasing out of ODS. (3 Marks)
 - (iii) Describe any three principal ways in which the phasing out of ODS is enforced in Swaziland. (3 Marks)

Question 6[25]

- (a) Legislation that protects soils against pollution in Swaziland currently does not exist, but soil pollution control is a requirement of any development proposal in terms of the Swaziland Environment Authority (SEA's) Environmental Audit and Assessment Regulations (EAAR) OF 2000.
- (i) Discuss the international laws that led to the establishment of the Swaziland Environment Authority (SEA). (4 Marks)
 - (ii) Describe how a "Proponent" of a proposed development is legally obliged to follow the EAAR of 2000. (4 Marks)
- (b) The pollution of soils by hazardous substances that cross the borders is controlled by the Basel Convention.
- (i) Outline the principles of the Basel Convention and its implications on the usage of hazardous waste disposal facilities by Swaziland in South Africa. (4 Marks)
 - (ii) Outline how the convention relates to the Swaziland Waste Regulations of 2000. (4 Marks)
 - (iii) Outline how the convention affects any proposals for strategic petroleum industry development in Swaziland, especially in regards to waste oil disposal. (4 Marks)

- (c) Describe the role of a “data base” in environmental monitoring of soil pollution against persistent organic pollutants (POPs) using international allowable limits of the USEPA. (5 Marks)