

UNIVERSITY OF ESWATINI



MAIN EXAMINATION 2020/2021

TITLE OF PAPER: SPECIAL TOPICS IN
ENVIRONMENTAL ANALYTICAL
CHEMISTRY

COURSE NUMBER: CHE636

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS: ANSWER ANY TWO (2) QUESTIONS
FROM SECTION A AND ANY TWO (2)
QUESTIONS FROM SECTION B.

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DO SO BY THE CHIEF INVIGILATOR.**

SECTION A: ENVIROMENTAL TOXICOLOGY

Question 1 (25 marks)

- (a) Define the following terms; [10]
- (i) Toxicity
 - (ii) Bioaccumulation
 - (iii) Lethal dose 50 (LD50)
 - (iv) Environmental toxicology
 - (v) Toxic agent
- (b) Sketch well-labelled diagrams for; [10]
- (i) Individual dose-response curve
 - (ii) Population dose-response curve
- (c) Outline 5 factors that affect the concentration and toxicity of a Chemical. [5]

Question 2 (25 marks)

- (a) Discuss 5 effects of exposure to chemical mixtures. [10]
- (b) Discuss the steps involved in the risk assessment process. [15]

Question 3 (25 Marks)

Discuss the following as sources of environmental toxicity;

- (a) Polychlorinated Biphenyls (PCBs) [7]
- (b) Heavy Metals [8]
- (c) Pesticides [7]

SECTION B: ENVIRONMENTAL LAW

Question 4 [25]

- a) International treaties and conventions govern water usage and its quality for transboundary rivers, and Eswatini has enacted laws to comply with these regional treaties. Briefly discuss the Inco Maputo Agreement in relation to the protocol on shared water courses between Eswatini, Mozambique and South Africa. [4]

- b) To comply with the water quality aspects of the Inco Maputo Agreement, the Eswatini Environment Authority is now empowered by the Environmental Management Act 2002 to institute proceedings against offenders through Protection Orders. Explain the processes that lead to the issuing of a Protection Order, and how admissible is it in a Court of Law? [4]
- c) The Swaziland Environment Authority Act of 1993 empowers the Minister of Environment and Tourism to make regulations under the Act. Describe the processes that the Eswatini Environment Authority followed in the gazetting of the Environmental Audit, Assessment and Review Regulations (EAARR) of 2000. [4]
- d) Local legislation, e.g., EAARR 2000, still uses EIA to assess development projects for environmental compliance, yet international funding agencies use ESIA principles. Discuss the differences between “EIA” and “ESIA”. [4]
- e) Discuss the principle behind
- i. The International Finance Corporation [3]
 - ii. The Equatorial Principle [3]
 - iii. The Minamata Convention [3]

Question 5 [25]

- a) (i) State the Glazewski’s definition of “Environmental Law” [2]
(ii) Prior to enactment of the Swaziland Environment Authority Act of 1993, environmental laws in Eswatini were fragmented. Use examples to explain the meaning of this phrase. [3]
- b) The Rio Summit on Sustainable Development in 1992 led to the consolidation of environmental laws in Eswatini. Explain how the Rio Summit led to the development of the Swaziland Environment Authority Act of 1993. [4]
- c) The Environment Management Act 2002 has superseded the Swaziland Environment Authority Act, 1993.
- i. Discuss the reasons for Eswatini repealing the Swaziland Environment Authority Act 1993. [3]
 - ii. Explain what is meant by the “Polluter – Pays” principle, and how the Water Pollution Control Regulations of 2010 effects this principle. [4]
 - iii. Explain the procedures for handling spills in accordance to the Water Pollution Control Regulations of 2010. [4]
- d) (i) Soil pollution in Eswatini is not regulated. Explain. [2]

(ii) Explain what is meant by “international best practice”, and how it is useful in the Eswatini situation where soil pollution is not regulated? [3]

Question 6 [25]

- a) The Constitution of Swaziland Act, 2005, is the supreme law in Eswatini. Discuss the roles of the Head of State, the Judiciary, the Legislative, and the Executive arms of government under the Constitution of Eswatini. [4]
- b) In relation to the Air Pollution Control Regulations of 2010,
- i. Explain how the United Nations Framework Convention on Climate Change (UNFCCC) led to the development of this legislation. [4]
 - ii. In 2010, Eswatini ratified the Kyoto Protocol. What are the aims and objectives of this Protocol? [4]
 - iii. What legal reforms are required in Swaziland in order to operationalize the Kyoto Protocol? [4]
- c) In relation to the Ozone Regulations of 2003, discuss the international convention that led Eswatini to formulate these regulations. [4]
- d) The control of hazardous substances that cross international borders is governed by the Basel Convention.
- i. Outline the principles of the Basel Convention and its implications on the usage of hazardous waste disposal facilities by Eswatini in South Africa. [3]
 - ii. What are the penalties upon conviction for offenders under the Waste Regulations of 2000? [2]