

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

(BSC) IN ENVIRONMENTAL HEALTH

FINAL EXAMINATION PAPER 2006

TITLE OF PAPER : ENVIRONMENTAL CHEMISTRY

COURSE CODE : EHS 401

DURATION : THREE HOURS

MARKS : 100

INSTRUCTIONS :

- : ANSWER ONLY FIVE QUESTIONS
- : EACH QUESTION CARRIES 20 MARKS
- : QUESTIONS ONE AND TWO ARE COMPULSARY
- : NO QUESTION PAPER SHOULD BE BROUGHT INTO
NOR OUT OF THE EXAMINATION ROOM
- : BEGIN EACH QUESTION ON A SEPARATE SHEET
OF PAPER

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR**

QUESTION ONE

- (a) Chemistry plays a central role in the life and health of all organisms. From the Environmental health point of view, defend this statement. (10 marks)
- (b) Why is there concern regarding the use and misuse of chemistry as far as the environment is concerned? (10 marks)

Total 20 marks

QUESTION TWO

- (a) What does the abbreviation CEC stand for? (1 mark)
- (b) List three factors that determine CEC of soils. (3 marks)
- (c) Name the three types of weathering (3 marks)
- (d) Describe how biological, chemical and physical weathering contribute to the formation of soil (9 marks)
- (e) With the help of a chemical equation, show how pyrite oxidation contribute to soil acidity (4 marks)

Total 20 marks

QUESTION THREE

- (a) Evaluate the environmental consequences of livestock production in communities areas (10 marks)
- (b) Describe the role played by Oxidation-Reduction reactions in the chemistry of dissolved species in water (10 marks)

Total 20 marks

QUESTION FOUR

- (a) Water supports all forms of life. It would be a grave mistake to temper with its chemistry. Support this argument (10 marks)
- (b) Water has a higher surface tension than any other liquid. Explain how this surface tension comes about and how it influences water chemistry (10 marks)

Total 20 marks

QUESTION FIVE

- (a) The atmosphere is a very important life support system. List the different layers of the atmosphere (4 marks)
- (b) Briefly describe the importance of the first two layers (from the earth surface) of the atmosphere in supporting life on earth (10 marks)

- (c) Briefly explain how climatic and topographic factors may affect the intensity and dispersion of air pollution in a city. (6 marks)

Total 20 marks

QUESTION SIX

- (a) What does the abbreviation PAN stand for? (1 marks)
- (b) Write the chemical formula for PAN (2 marks)
- (c) At what point in the smog-producing chain reaction is PAN formed? (2 marks)
- (d) What are the main species responsible for the oxidation of NO to NO₂ in a smoggy atmosphere? (2 marks)
- (e) Briefly describe the effects of PCBs on human health (7 marks)
- (f) Write balanced chemical equations to show the oxidation of sulfur and its conversion to sulfuric acid which comes down as acid rain during the combustion of fossil fuels. Show all the steps. (6 marks)

TOTAL 20 MARKS

GOOD LUCK!!!!