



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

THIRD SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE

(ENVIRONMENTAL HEALTH)

HEH 312: ENVIRONMENTAL CHEMISTRY II

DATE: Monday, 25th July, 2016

TIME: 8.00 a.m. - 10.00 a.m.

INSTRUCTIONS:

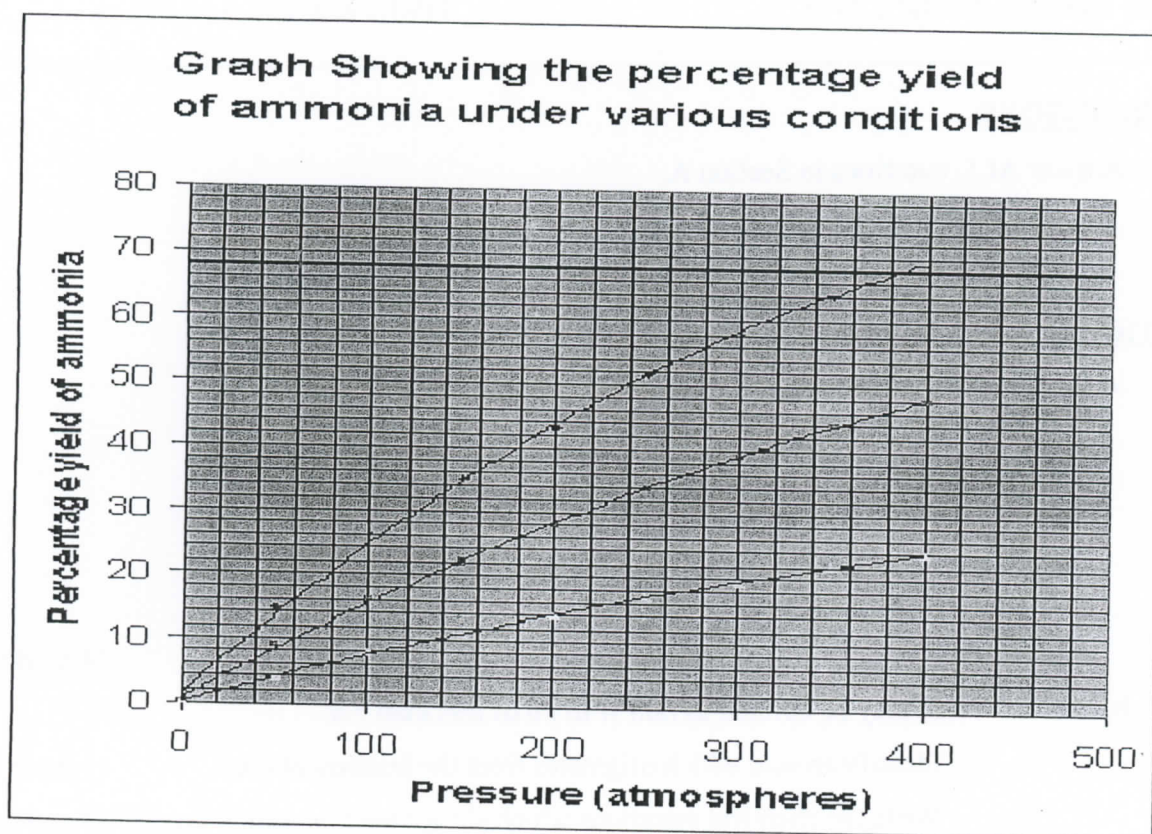
- Answer **ALL** questions in Section A
- Answer question **TWO** and any other **TWO** questions in Section B

SECTION A

1. a) Define the following terms as used in environmental chemistry.
 - i) Electrolytic reduction
 - ii) Photochemical smog
 - iii) Anthropogenic emissions
 - iv) Condensation polymerization

(4 marks)
- b) Acid rain may be defined as rain with Ph of less than 5.6.
 - i) Identify an acid which originates from the burning of coal. (1 mark)
 - ii) Write the chemical equations which show how this acid is formed. (3 marks)
 - iii) Suggest how the production of the acid formed as a result of burning coal can be reduced. (2 marks)
- c) State **four** main toxic types of chemical pollutants in water. (4 marks)
- d) Shopping bags and other plastic objects are not decomposed by micro-organisms.
 - i) Define the term biodegradability. (1 mark)
 - ii) Describe **two** environmental impacts of plastic bags that have been washed through storm water drains into a waterway. (2 marks)
- e) Use the graph below to answer the following questions.
 - i) Why is the yield always less than 100%? (1 mark)

- ii) The graph shows that the maximum yield of ammonia would be obtained by using a pressure of 400 atmospheres and a temperature of 350°C. However, a chemical plant uses pressures of 200 atmospheres and a temperature of 450°C. Explain why a pressure of 200 atmosphere is used, rather than 400 atmospheres. (2 marks)



SECTION B

- Answer question **TWO** and any other **TWO** questions.
 - Question **TWO** carries 20 marks, the other questions carry 15 marks each.
2. Increased nutrient flows into shallow coastal marine environments which has been witnessed in the Gulf of Mexico and the Baltic Sea have resulted in wide scale anoxia (dead zones). Discuss this phenomena. (20 marks)

3. a) Using chemical equations, describe the Ostwald process. (10 marks)
b) Describe the environmental health implications of Ostwald process. (5 marks)
4. a) Discuss the formation of photochemical smog. (10 marks)
b) Describe the environmental health effects of photochemical smog. (5 marks)
5. a) Using chemical equations, describe the process of making soaps and detergents. (10 marks)
b) Briefly discuss the environmental health problems associated with liquid waste containing high concentrations of soaps and detergents. (5 marks)
6. a) Using a clearly labeled diagram, describe the industrial extraction of iron. (10 marks)
b) Discuss the environmental health effects associated with extraction of iron. (5 marks)