



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2009/2010

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (FOODS, NUTRITION & DIETETICS)

HFN 100: INTRODUCTION TO CHEMISTRY

DATE: MONDAY, 21ST DECEMBER 2009

TIME: 8.00 A.M. - 10.00 A.M.

SECTION A

Answer ALL questions.

- State the law of mass action.
 - Give the mathematical expression for K_{eq} for the following reaction:
$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 2H_{2(g)} \quad (6 \text{ marks})$$
- Explain how the size of reacting particles affect the rate of a reaction. (6 marks)
- Using radioactive Fe show how the β - emission or electron capture process affects the Fe nuclide. (6 marks)
- Calculate the p^H of a solution of 0.02 m CH_3COOH . Given the K_a to be 1.65×10^{-5} . (6 marks)
- Calculate the weight of NaCl required to prepare a 1 litre solution of 500ppb Na^+ ions. (6 marks)

SECTION B

Answer **TWO** questions only.

6. a) Describe how to determine the enthalpy of neutralization for HCL and NaOH reaction. (7 marks)
- b) Draw the thermo chemical cycle for lattice energy of NaCl. (7 marks)
- c) Define the following terms:
- (i) Standard Enthalpy of formation
- (ii) Enthalpy of precipitation (6 marks)
7. a) Explain the nuclear stability of elements. (7 marks)
- b) Explain the formation of C-14 in the environment. (6 marks)
- (c) Derive the expression for decay constant for a radioactive nuclide. (7 marks)
8. Write explanatory notes on each of the following:
- a) Dynamic nature of a chemical equilibrium (5 marks)
- b) Standard hydrogen cell. (5 marks)
- c) Radiocarbon dating (5 marks)
- d) Applications of radioactivity. (5 marks)
