



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

(FOODS, NUTRITION AND DIETETICS)

HFN 100: INTRODUCTION TO CHEMISTRY

DATE: Thursday 7th April, 2011

TIME: 2.00 p.m. – 4.00 p.m.

INSTRUCTIONS

Answer *ALL* questions.

- Q1. (a) Calculate the number of moles in 25.0ml of 0.01M HCl. [2 marks]
(b) Show how to prepare 100.0ml of 0.05M NaOH solution from a stock solution of 2M NaOH solution. [3 marks]
- Q2. (a) Give the K_{sp} expression for
(i) Lead (ii) Chloride
(ii) Silver Chromate [4 marks]
- Q3. Sketch a graph showing positive deviation from Raoult's law. [5 marks]
- Q4. (a) State Hess's Law. [2 marks]
(b) Draw a thermochemical cycle for conversion of carbon into carbon dioxide gas. [3 marks]
- Q5. (a) Explain the use of reference electrode in electrochemistry. [2 marks]
(b) Calculate the standard potential of the cell:
 $\text{Cu(s)}/\text{Cu}^{+2}(\text{aq})//\text{Cl}^{-1}(\text{aq})/\text{AgCl(s)}/\text{Ag(s)}$
Given: $\text{Cu}^{+2}/\text{Cu} = +0.33\text{V}$, $\text{Ag}^{+1}/\text{Ag} = +0.799\text{V}$ [3 marks]
- Q6. (a) Explain the advantages of Lewis concept of acids and bases. [2 marks]
(b) Calculate the pH of 0.01M KOH. solution. [3 marks]

SECTION B

Answer ALL questions.

- Q7. (a) State the law of mass action. [3 marks]
- (b) When ethanol and ethanoic acid are mixed in equivalent proportions, equilibrium is attained when two third of the acid and alcohol are consumed. How much ester will be present in the equilibrium mixture if 240g of ethanoic acid are mixed with 138g of ethanol. (C = 12, H = 1, O = 16) [9 marks]
- (c) Explain how changes in the concentration affects the equilibrium constant. [8 marks]
- Q8. (a) Explain the factors that affect the rate of a reaction. [8 marks]
- (b) Describe an experiment to determine the rate of the following reaction:
$$\text{S}_2\text{O}_3^{2-} + 2\text{H}^{+1} \rightarrow \text{S} + \text{SO}_2 + \text{H}_2\text{O}$$
 [12 marks]
- Q9. Write explanatory notes on each of the following:
- (a) Stability of heavy nuclides. [6 marks]
- (b) Incorporation of C-14 into animal bones. [5 marks]
- (c) Determination of molecular mass of sucrose using Raoult's law. [11 marks]

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