



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

SEPTEMBER –DECEMBER 2021

FACULTY OF SCIENCE

DEPARTMENT OF COMMUNITY HEALTH AND DEVELOPMENT

REGULAR PROGRAMME

CHD 112: GENERAL CHEMISTRY

Date: DECEMBER 2021

Duration: 3 Hours

INSTRUCTIONS: INSTRUCTIONS:

1. Write your number on every page
2. Answer ALL Questions in the booklet provided

Write legibly

Instructions

SECTION A: SHORT ANSWER 10 QUESTIONS: 30 MARKS

1. Define the terms. (4 marks)
 - i. Atom
 - ii. Element
 - iii. Atomic number
 - iv. Isotope
2. State the Kinetic energy theory. (1 mark)
3. State Boyle's law. (1 mark)
4. State Charles law. (1 mark)
5. What is a mixture? (1 mark)
6. What is a solution? (1 mark)
7. Describe four phase changes of states of matter. (4 marks)
8. State any 4 factors that influence the rate of reactions. (4 marks)
9. Distinguish between strong acid and weak acid (2 marks)

10. Differentiate between oxidation and reduction (2 marks)
11. In the bonding between Sodium and Chlorine, describe how each loses or gains electrons to form sodium chloride. (4 marks)
12. Calculate the number of moles in 1.45g of NaCl (Na= 23, Cl=35.5) (2 marks)
13. Calculate the molarity of a solution of 3.00 Moles of NaCl in 800 ML of solution (Na= 23, Cl=35.5). (3 marks)

SECTION B: Answer Question 14 (COMPULSORY) and ANY Other One Question 40 Marks.

14. This question concerns the structure of elements, acids and bases, mixtures and determination of quantities of elements in a substance.
- a. Draw the atomic structure of an Oxygen atom. (5 marks)
- b. State and give the reason as to whether the following are acids, bases or neutralization. (4 marks)
- i. $Zn + 2H^+ \rightarrow Zn^{2+} + H_2$
 - ii. $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$
 - iii. $HClO + LiOH \rightarrow LiClO + H_2O$
 - iv. $HCl + H_2O \rightarrow H_3O^+ + Cl^-$
- i. A patient in intensive care is receiving 2000L of oxygen pumped at a pressure of 90 PSI. What pressure will be the pressure if the volume delivered to the lungs is to increase to 2500L? (3 marks)
- i. Establishing the quantity of a substance is important in the preparation of solutions and mixtures such as stock solutions of medicines.
- i. What is the percent by volume concentration of a solution in which 75.0 ml of ethanol is diluted to a volume of 250.0 ml? (2 marks)
 - ii. What volume of acetic acid is present in a bottle containing 350.0 ml of a solution which measures 5.00% concentration? (2 marks)
 - iii. Find the percent by mass in which 41.0 g of NaCl is dissolved in 331 grams of water. (2 marks)
 - iv. How many milliliters of a 5 M stock solution of NaCl are needed to prepare 100 ml of a 0.4 M solution? (2 marks)
15. Describe 5 types of reactions (10 marks)

- i. Balance the following equation. **(5 marks)**



- ii. Describe five factors that influence the rate of reaction of a chemical reaction **(5 marks)**

16. Chemical elements lose or gain electrons to fill up their valence electron needs during reactions which involve bond formations.

- i. Describe any five types of chemical bonds. **(10 marks)**
- ii. The principal toxic component of cassava Hydrogen cyanide (HCN). Ingestion of cyanogenic glycosides begins in the first steps of digestion, consisting of acid hydrolysis, followed by enzymatic hydrolysis by the microflora. Draw a diagram showing the bonding between H, C and N, and name the type of bond. **(5 marks)**
- iii. List any five (5) properties of ionic compounds. **(5 marks)**

END