

OCTOBER 2023
EBS 132
GENERAL CHEMISTRY
1 HOUR 30 MINUTES

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, SEPTEMBER/OCTOBER 2023

5TH OCTOBER 2023

GENERAL CHEMISTRY

12:30 PM – 2:00 PM

SECTION B
[40 MARKS]

Answer any TWO questions from this Section.
Please, note that if you answer more than two questions, only the first two will be marked.

1.

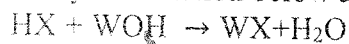
- a. Copy and complete the table below (8 marks)

Particle	Relative mass	Relative charge	Location in atom
Proton			
Neutron		0	
Electron			

- b. Give the IUPAC names for the following species. (4 marks)

- Fe_2O_3
- SO_4^{2-}
- Na_2CO_3
- H_3PO_4

- c. Study the reaction below and use it to answer the questions that follow: (4 marks)



- Name the type of reaction illustrated.
- Which species is;
(α) an acid?
(β) a salt?
(γ) a base?

- d. What are hydrocarbons? Give any three examples of hydrocarbons. (4 marks)

2.

- a.
- What is a functional group?
 - Identify the functional groups of the following compounds and give their family names:
(α) CH_3COOH
(β) $\text{CH}_2\text{CH}_2\text{CH}=\text{CHCH}_3$
(γ) $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ (4 marks)
- b. Complete the table below with the colours observed when the given indicators are each added to alkaline or acidic solution. (4 marks)

Indicator	Colour in alkali	Colour in acid
Litmus
Methyl orange	Red
Phenolphthalein	Red/Pink

- c. An anti-acid tablet contains magnesium hydroxide as the only basic ingredient. Write a balanced chemical equation for the reaction between magnesium hydroxide and hydrochloric acid, the acid produced in the stomach. (4 marks)
- d. Complete the table below (6 marks)

element	Mass number	Atomic number	Electron number	Proton number	Neutron number
Ca^{2+} (calcium ion)	40			20	
Cl^- (chlorine ion)	35	17			
H^+ (hydrogen ion)	1				0
N (nitrogen)	14			7	

- e. Draw the Bohr's electronic configuration for the chlorine atom (atomic number 17) (2 marks)

3.

- a. Give the appropriate method for separating the components of the following mixtures. (4 marks)
- Crude
 - Ethanol and water
 - Dyes from ink
 - Iron fillings and sulphur
- b. For each of the following atoms, give the number of protons and neutrons that occurs in their nucleus. (4 marks)
- ${}_{94}^{238}\text{Pu}$
 - ${}_{29}^{65}\text{Cu}$
 - ${}_{24}^{52}\text{Cr}$
 - ${}_{2}^4\text{He}$

- c. Using the Lewis structure, draw the diagram to show the nature of bond in each of the following compounds. (4 mark)
- CO_2
 - N_2
- d.
- What is a functional group? (1 mark)
 - Give the IUPAC names of the following (3 marks)
(α) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
(β) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- e. State **four** properties of covalent compounds. (4 mark)

4.

- a. Name the following compounds (4 marks)
- $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CHBrCH}_3$
 - $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{COOH}$
 - $\text{CH}_3\text{CHOHCH}_2\text{CH}_2\text{CH}_3$
 - $\text{CH}_2\text{ClCCCCl}(\text{F})_2$
- b. Write a balanced equation of the reaction between hydrochloric acid and calcium carbonate. (4 marks)
- c. Calculate the relative molecule mass of the following molecules. (4 marks)
- S_8
 - CO_2
 - H_2SO_4
 - $\text{C}_6\text{H}_{12}\text{O}_6$
- [Relative atomic masses, Ar are $\text{S} = 32$, $\text{C} = 12$, $\text{H} = 1$, $\text{O} = 16$].
- d. State **four** properties of ionic compounds. (4 marks)
- e.
- Define acid and base according to Arrhenius concept. (2 marks)
 - Give **four** properties of a base (2 marks)