

MAY 2022  
EBS 302P  
GENERAL CHEMISTRY PRACTICAL III  
2 HOURS

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)  
THIRD YEAR, END-OF-FIRST SEMESTER EXAMINATION, MAY 2022

MAY 17, 2022

GENERAL CHEMISTRY PRACTICAL III

9:00 AM – 11:00 AM

Answer any **THREE** questions.  
(60 MARKS)

1. Hydrogen peroxide has become one of the chemicals preferred in the preparation of hand sanitizers according to world health organisation standards.
  - a. In an experimental set up, draw and label the preparation of oxygen gas using hydrogen peroxide.
  - b. Write a balanced chemical equation for the reaction.
  - c. State the chemical test for the gas
  - d. Describe how you will conduct the test stated in (c) above
  - e. What method of delivery or collection was used to collect the hydrogen gas?
  - f. Write **four** properties of hydrogen gas.

2. W, X, Y and Z are solutions of inorganic salts. Perform the following tests on each of the solutions. Test any gas evolved.

a. To about 2cm<sup>3</sup> of each of W, X, Y and Z in a test tube add aqueous NaOH in drops and in excess.

b. To about 2cm<sup>3</sup> of F in a test tube add dilute NH<sub>3</sub> in drops and in excess.

Use the above information to complete the table below.

	TEST	OBSERVATION	INFERENCE
i.	W + NaOH aq. Drops Excess	White chalky ppt. A.....	B..... Ca <sup>2+</sup> confirmed
ii.	X + NaOH aq. Drops Excess	C..... D.....	Cu <sup>2+</sup> present E.....
iii.	Y + NaOH aq. Drops  Excess	F.....  G.....	Fe <sup>3+</sup> present  H.....
iv.	Z + NH <sub>3</sub> aq. Drops Excess	White gelatinous ppt. I.....	J..... Al <sup>3+</sup> confirmed

3.

a. Write the chemical equations which are responsible for the following observations:

i. Ammonia gas produces dense white fumes with conc. HCl vapour.

ii. Carbon dioxide gas turns aqueous calcium hydroxide milky.

iii. Name the substance responsible for the observations in i and ii above respectively.

iv. State **two** properties of carbon dioxide which makes it ideal for use in fire extinguishers

b. A student performed a test by adding an acid to an unknown sample. It was observed that a colourless odourless gas which is heavier than air and slightly soluble in water, forming an acidic solution. The gas does not support combustion. It is collected by downward delivery or upward displacement of air. It is dried by passing it through concentrated H<sub>2</sub>SO<sub>4</sub> or anhydrous CaCl<sub>2</sub>.

i. Identify the type of gas evolved from the reaction.

ii. How will you test for the gas (confirmatory test)

iii. State **three** uses of the gas

4. **K** is a solution of an inorganic salt  
**L** is a solution of trioxonitrate (V) salt

a. Copy and complete the table below:

TEST	OBSERVATION	INFERENCE
i. <b>K</b> + NaOH <sub>(aq)</sub> in drops  then in excess	White precipitate  B.....	A.....  Ca <sup>2+</sup> present
ii. <b>K</b> + AgNO <sub>3(aq)</sub> + HNO <sub>3(aq)</sub> + NH <sub>3(aq)</sub>	C..... D..... E.....	Cl <sup>-</sup> , CO <sub>3</sub> <sup>2-</sup> , SO <sub>3</sub> <sup>2-</sup> , S <sup>2-</sup> may be present Cl <sup>-</sup> confirmed
iii. <b>L</b> + NH <sub>3(aq)</sub> in drops  then in excess	White gelatinous precipitate formed  G.....	F.....  H.....
iv. <b>K</b> + <b>L</b> + heat then cooled	I..... J..... K.....	PbCl <sub>2</sub> present Pb <sup>2+</sup> confirmed

b. State **two** reagents that could be used to identify the anion present in **L**.