

AUGUST 2023
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, AUGUST 2023

15TH AUGUST 2023

GENERAL CHEMISTRY PRACTICAL III

9:00 AM – 11:00 AM

[60 MARKS]

Answer any TWO questions.

1.

- a. Read the instructions below and answer the questions which follow:
- A student added 1 cm³ of an aqueous solution of a cation into a test tube and added a few drops of diluted NaOH (aq) and observed a white chalky precipitate. Name the cations that are likely to be present. (4 marks)
 - Excess dilute NaOH (aq) was added and there was formation of insoluble precipitate. Name the cations present. (2 marks)
 - A sample of an aqueous solution was added to 1 cm³ of dilute NH₃ (aq) solution, no precipitate was formed and there was no evolution of gas. Name the cations that are likely to be present. (4 marks)
 - When a few drops of NaOH (aq) was added and warmed, there was an evolution of gas. This gas was coloured and smelled like urine. This gas also turns red litmus paper blue and gives a thick white fume with concentrated HCl (aq). Name this cation. (2 marks)
 - State **four** physical properties of oxygen gas. (8 marks)
- b. Name **two** impurities that are normally present in gases produced from chemical reactions. (6 marks)
- c. Identify **two** factors that affect the collection of a gas. (4 marks)

2.

- a. Give **four** properties of Hydrogen gas. (8 marks)
- b. List **six** apparatus/materials/reagents needed to prepare hydrogen gas. (6 marks)
- c. Give **four** uses of hydrogen gas. (8 marks)
- d. How is hydrogen gas collected in the laboratory? (2 marks)
- e. Explain how you would collect dried gas of hydrogen. (4 marks)
- f. How would you test for hydrogen gas in the laboratory? (2 marks)

3.

- a. Identify the compounds/ions/gases per the descriptions below. (10 marks)
 - i. **K** reacts with a few drops $\text{NaOH}_{(aq)}$ and forms White chalky ppt but ppt dissolves with excess NaOH . What is the correct identity of **K**?
 - ii. A sample **G** on heating has a pungent smell with a reddish-brown effervescence. The vapour turns blue litmus red. What could **G** be?
 - iii. A sample **Q** turns green ppt when NaOH is added to it in drops but dissolves when excess NaOH is added to it. Sample **Q** turns Light blue with potassium Hexacyanoferrate (II). What could be Sample **Q**?
 - iv. A sample **L** turns blue ppt when NaOH is added to it in drops but turns brown ppt with potassium Hexacyanoferrate (II). What could be Sample **L**?
 - v. A gas gives white dense fumes with ammonia gas. Addition of silver nitrate to the gas gives a white ppt. What could this gas be?
 - vi. An unknown solution is tested with sodium hydroxide. A red-brown precipitate is formed. A separate sample of the same solution is then tested with barium chloride and a white precipitate is formed. Select the cation and the anion present in the solution?
- b. In the laboratory preparation of oxygen from hydrogen peroxide - answer the following:
 - i. Draw a neat, labelled diagram for the method used in the above preparation. (6 marks)
 - ii. Name the catalyst used in the preparation and state its function. (2 marks)
 - iii. State the word equation for the reaction involving the above preparation of oxygen. (4 marks)
 - iv. State the method of collection of the oxygen gas giving reasons. (4 marks)