UNIVERSITY OF EDUCATION, WINNEBA
INSTITUTE FOR TEACHER EDUCATION AND CONTINUING PROFESSIONAL DEVELOPMENT (ITECPD)

END-OF-SECOND SEMESTER EXAMINATIONS, NOVEMBER, 2023

LEVEL 400
COURSE CODE: JBI 481
COURSE TITLE: CHEMISTRY AROUND US
TIME ALLOWED: 2 HRS

STUDENT'S INDEX NUMBER:

GENERAL INSTRUCTIONS:

- **This paper is made up of ONE SECTION.**
- ***The Section is made up of five essay type questions.***
- ***Answer any THREE questions in your answer booklet.***
- ***Each question carries equal marks. You are expected to start each question on a new page.***
- ***You are expected to hand over your answer booklet to the invigilator before you leave the examination hall.***

Instruction: *Answer any three (3) questions in the answer booklet provided.*

1. (a) (i) Calcium and magnesium belong to the same group of elements on the periodic table. Which of these two elements has the biggest size? Explain your answer. **[3 marks]**

(ii) Copy and complete the table **[3 marks]**

Particle	Relative Mass	Relative Charge
Proton		
Neutron		
Electron		

(b)(i) Explain **one** chemical method for testing for the presence of water. **[2 marks]**

(ii) List **two** (2) methods of water purification. **[2 marks]**

(c) Briefly describe how you would teach the topic "Physical properties of bases" to Bs8 learners. **[10 marks]**

2. (a) A buffer solution contains 0.10 moldm $^{-3}$ CH_3COOH and 0.15 moldm $^{-3}$ CH_3COONa. Determine the pH of the buffer solution. **[5 marks]**

(b)(i) Explain the following terms.

(α) Co-planning **[2 marks]**

(β) Co-teaching **[2marks]**

(γ) Co-assessment **[2 marks]**

(ii) Outline **two** (2) methods that can be used to co-assess a science lesson. **[4 marks]**

(c) (i) State **three** (3) buffer systems in our daily lives. **[3 marks]**

(ii) Define Lewis acid. **[2 marks]**

3. (a) (i) State **five** (5) importance of potassium in food production. **[5 marks]**

(b)(i) Distinguish between a strong electrolyte and a weak electrolyte. **[2 marks]**

(ii) List **three** (3) applications of electrolytes in the human system. **[3 marks]**

(c) (i) State **five** positive effects of a stable climate on food production. **[5 marks]**

(ii) Explain the term chemical reaction and give one example of a balanced chemical equation. **[5 marks]**

4. (a) (i) List **three** (3) physical properties of ionic compounds. **[3 marks]**

(ii) State the type of chemical bond that would exist between the following compounds: **HCl, NH_3, Li_2O, NH_4^+, $CaCl_2$** **[5 marks]**

(b)(i) What is Greenhouse effect? **[2 marks]**

(ii) How does the Greenhouse effect bring about climate change? Explain two factors. **[4 marks]**

(c) With the aid of a diagram, show the type of bond that would exist between atoms of hydrogen and chlorine. **[6 marks]**

5. (a) (i) Calculate the pH of 0.15 moldm $^{-3}$ H_2SO_4 solution. **[4 marks]**

(ii) Explain the term conjugate acid – base pair. **[2 marks]**

(b) With the aid of a 50 minutes lesson plan, demonstrate how you would teach the topic "Subatomic particles of an atom" to Basic Nine learners. **[10 marks]**

(c) Select the conjugate acid base pairs in the following chemical reactions.

(α) $HNO_3 + NH_3 \rightleftharpoons NH_4^+ + NO_3^-$ **[2 marks]**

(β) $CH_3COOH + H_2O \rightleftharpoons CH_3COO^- + H_3O^+$ **[2 marks]**