

**NATIONAL OPEN UNVERSITY OF NIGERIA**

**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE & APPLIED SCIENCES**

**JULY 2017 EXAMINATION QUESTIONS**

**CHM413: Analytical Chemistry II**

**CREDIT UNIT: 2Units**

**TIME: 2 HOURS**

INSTRUCTION: ANSWER QUESTION ONE & ANY OTHER THREE QUESTIONS.

QUESTION ONE

1. List any two instruments used for making electrode potential measurements (2 marks)
2. Define the term “error”. (2 marks)
3. Outline and discuss the various types of error. (10 marks)
4. i What do you understand by the terms ‘’ accuracy and precision’’. (1 mark)

ii. Differentiate between accuracy and precision. (2 marks)

1. Thirteen measurements of the concentration of calcium in ground water samples gave the

following results:

9.61, 9.76, 9.34, 10.98, 14.46, 12.16, 11.56, 17.77, 20.11, 13.90, 18.25, 16.55, 15.56

Calculate the:

 i) Mean

 ii) Median

 iii) Standard deviation

 iv) The 95% confidence limits for the true pH

(8 marks)

QUESTION TWO

 Explain briefly the classification of substances base on electrical conductivity (10 marks)

Highlight the steps involved in the preparation of a chromatographic column. (5marks)

**Question 3**

a) Describe the basic components of a pH meter ( 5 marks)

b) List and explain the factors that affect the conductivity of an electrolyte solution. (10marks)

**Question 4**

a) Explain briefly the following terms:

 i) retention time ii) mobile phase iii) chromatography iv) analyte (10marks)

b) Describe the operating principles of (i) Thin layer chromatography (TLC) and (ii) Column

 Chromatography. ( 5 marks)

**Question 5**

a) List five basic applications of the differential scanning calorimeter. (5 marks)

b) Explain the basic working principle of a Liquid Membrane Electrode. (10 marks)