**NATIONAL OPEN UNIVERSITY OF NIGERIA**
**14/16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS**
**SCHOOL OF SCIENCE AND TECHNOLOGY**
**JUNE/JULY EXAMINATION**

**COURSE CODE: CHM413**
**COURSE TITLE: ANALYTICAL CHEMISTRY II**
**TIME ALLOWED: 2 hours**
**INSTRUCTION: Answer any four questions**

**Question 1**

(a) Define the term “error”.
(2 $\frac{1}{2}$ marks)

(b) List and discuss the various types of error.
(10marks)

(c) Distinguish between accuracy and precision.
(5 marks)

**Question 2**

Seven measurements of the pH of a buffer solution gave the following results:
5.12, 5.20, 5.15, 5.17, 5.16, 5.19, 5.15
Calculate:

i) Mean
ii) Median
iii) Standard deviation
iv) The 95% confidence limits for the true pH

(17 $\frac{1}{2}$ marks)

**Question 3**

a) Describe the basic components of a pH –meter
(7 $\frac{1}{2}$ marks)

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

**Question 4**

a) Briefly explain the following terms:
i) retention time ii) mobile phase iii) chromatography iv) analyte (10marks)

b) Differentiate between thin layer chromatography and column chromatography. (7 $\frac{1}{2}$ marks)

**Question 5**

a) Enumerate and explain five applications of the differential scanning calorimeter. ($7\frac{1}{2}$ marks)

b) Explain the basic principle of a liquid membrane electrode. (10marks)

**Question 6**

a) Discuss the various steps involve in preparation of column. (5marks)

b) Discuss the factors that affect the conductance of electrolyte solutions. ($7\frac{1}{2}$ marks)

c) Explain the basic principle of ion-exchange chromatography. (4marks)