NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
MARCH/APRIL 2016 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: **CHM413**
COURSE TITLE: **ANALYTICAL CHEMISTRY II**

Duration: **2hrs**
Answer any four questions

Question 1
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 2

(a) Define the term "error". (2 $\frac{1}{2}$ marks)
(b) List and discuss the various types of error. (10 marks)
(c) Distinguish between accuracy and precision. (5 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) Discuss the various steps involve in preparation of column. (5marks)

b) i) Classify detectors used in High Performance Liquid Chromatography (HPLC).**(3 marks)**

(ii) Define the term heat capacity of a calorimeter and describe how to determine the heat capacity of a substance experimentally. **(3 marks)**

(iii) Describe the relationship between heat transferred and change in temperature. **(2 ½ marks)**

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

Question 6

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)