NATIONAL OPEN UNIVERSITY OF NIGERIA
14/16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS
SCHOOL OF SCIENCE AND TECHNOLOGY
MARCH/APRIL 2014 EXAMINATION

COURSE CODE: CHM413
COURSE TITLE: ANALYTICAL CHEMISTRY 11
TIME ALLOWED: 2HOURS
INSTRUCTION: Six questions to answer four(Each question carriers a total 17 $\frac{1}{2}$ marks)

Question 1

a) Distinguish between random and systematic errors (7 $\frac{1}{2}$ marks)
b) Define the following terms:
i) Random error ii) Confidence limits
iii) Accuracy iv) Precision (2 $\frac{1}{2}$ mark each; total of 10marks)

Question 2

The result of the concentration of zinc metal (mg/L) in soil of a waste dump is presented as follows:
178.0 125.68 100.50147.50 111.16 95.46 143.20 98.89

Calculate:

i) Mean (3 $\frac{1}{2}$ marks)
ii) Median (4 marks)
iii) Standard deviation (5 marks)
iv) The 95% confidence limits for the true mean.
(5 marks)

Question 3

a) State two types of glass membrane electrode
(5 marks)
b) A solution is 10^{-3}M in $Cr_2O_7^{-2}$ and 10^{-2}M inCr^{3+}. If the pH is 2.0, what is the potential of the half reaction?
(8 $\frac{1}{2}$ marks)

Question 4

a) Discuss the factors that affect the conductance of electrolyte solutions. (8 $\frac{1}{2}$ marks)
b) Differentiate between thin layer chromatography and column chromatography. (9marks)

Question 5

Write short notes on the following:
a) Electrochemical deposition b) Particulate radiation c) Electromagnetic radiation

d) Ion exchange techniques. (4 $\frac{1}{2}$ mark each; total of 17 $\frac{1}{2}$ marks)

Questions 6

a) State the Kohlrausch law of independent migration of ions (3 $\frac{1}{2}$ marks)

b) Briefly explain the two application of Kohlrausch law of independent migration of ions (5 marks)

c) For acetic acid (HAc), Λ^{o} = 390.6 ohm^{-1} cm^{2} mol^{-1}, while at a concentration of 0.003441 mol dm^{-3}, Λ = 27.19 ohm^{-1} cm^{2} mol^{-1}. What is the degree of disassociation, the concentration of each species, and the equilibrium constant? (9 marks)