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

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: **CHM409**
COURSE TITLE: **ELECTROCHEMISTRY**

Duration: **2 hours**
INSTRUCTION: Answer *Question 1* and *any other three (3) questions*

Question 1
a) Define electrochemical system. (2 Marks)
b) State the three basic ways through which differences of potential can occur. (4½ Marks)
c) Describe the two major types of metal interphase (11 Marks)

Question 2
a). Briefly describe the Stern model on the existent of an electric double layer (Use suitable diagram to support your answer) (8 ½ marks).
b) What are the parameters that affects the structure of an electric double layer.**(5 Marks)**
c) What are the basic application of electric double layer in the industries (**4 marks)**

Question 3

a) Describe how a non-polarizable interphase can be polarized. (6 ½ marks)
b) Explain the two main types of polarization in an electrochemical cell.(5 marks)

c)Define the following terms:
i) exchange current density

ii) ion transport
iii) Mobility

(6 marks)

Question 4
a) Explain briefly the three main ways by which ions are transferred in solution in the absence of fluid turbulence.(4 ½ marks)

b) Derive an expression that relates cathodic over potential to the cathodic current (i_C) and the limiting current (i_L). From the expression, state what will happened to the overpotential if $i_C < i_L$ and $_C = i_L$.(13 marks)

Question 5

a) What is meant by Polarography?(4 ½ marks)
b) Explain the basic principle of Polarography (9 marks)
c) What is the significant of half wave potential in polarography? (4 marks)

Question 6

a) What do you understand by the term electronics? (3 ½ marks)

b) Describe the block diagram of an electrochemical measuring instrument. (6 marks)

c) Give two examples of Transducers (2 marks)

d) Explain the basic principle of a pH electrode (6 marks)