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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS**

**SEPTEMBER/OCTOBER 2015 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) List the three major electrochemical interphases that you know and explain the order***

***expected for diffusion of ions or other elementary particles in each of them. 13 ½ marks***

***b) State three factors that affect the conductivity of an electrolyte. 4 ½ marks***

***Question 2***

***a)Briefly describe the classical model on the existent of an electric double layer (Use suitable***

***diagram to support your answer) 8 ½ mark***

***b). What are the parameters that affects the structure of an electric double layer? 5 marks***

***C)What are the basic applications of electric double layer in the industries? 4 mark***

***Question 3***

***a) Differentiate between polarizable and non polarizable electrode 5 marks***

***b) Describe the Significance of Tafel Plots 6 marks***

***c) List and explain the two main types of polarization in an electrochemical cell. 4 ½ mark***

***d) What is the difference between over voltage arising from cathodic and anodic polarization -***

***respectively.* 2 mark**

***Question 4***

***a) State Fick’s first law of diffusion (***2 ½ marks)

***b) Derive an expression that relates cathodic over potential to the cathodic current (iC) and***

***the limiting current (iL). From the expression, state what will happened to the***

***overpotential ifiC<iL and C = iL. 15 ½ marks***

***Question 5***

1. ***Define the terms: i) ion transport and ii) Mobility 3 marks ( 1 ½ mark each )***
2. ***List and explain three principal ways by which ions are transferred in solution in the absence of fluid turbulence.*** 3 marks
3. ***Write a general equation to show how these three aspects are related to mass transport.*** ***2 marks***
4. ***Describe the basic principles of polarography (9 ½ marks)***

***Question 6***

***a) List and explain five (5) Factors affecting the half-wave Potentials. 10 marks***

***b) What is a transducer.? Give one example. 2 marks ( 1 mark each )***

***c) Define the following terms in respect to a transducer:***

***sensitivity and selectivity 3 marks ( 1 ½ marks each)***

***d) State any six (5) application of polarography 2 ½ marks***