DEPARTMENT OF CHEMISTRY
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
FIRST SEMESTER EXAMINATION 2021/2022 SESSION

COURSE TITLE: APPLIED SURFACE AND COLLOID CHEMISTRY
COURSE CODE: CHM411
CREDIT UNITS: 2
TIME ALLOWED: 2 HOURS

INSTRUCTION: ANSWER ANY THREE QUESTIONS

Q1(a). Explain the following observations:

(i) Water spreads on a clean glass surface and wets it; but not on a waxy or greasy surface (**2 marks**)
(ii) Ducks do not float on water containing much detergent (**2marks**)
(iii)Bubbles do not shrink to reduce the total surface area (**2 marks**)
(iv)Cohesive forces contributes more to surface tension than adhesive forces (**2 marks**)

(b) Explain the principles of wetting and spreading **(6 marks)**
(c) State the Freundlich and Langmuir adsorption equations. Are these equation theoretically or empirically derived? **(6 marks)**

Q2.(a) Explain the phenomenon of molecules at the surface and at the interior of a homogeneous solution (**5 marks**)

(b**)**. (ii) Write brief notes on the following: (i) Molecular colloids (ii) Purification of colloids **(6 marks)**

(i) Enumerate any three differences between coarsely and highly dispersed colloidal system **(3 marks)**

(c). For the following colloids; foams, milk, mist, tooth paste, paints and detergents. Identify the nature of i. dispersed phase ii. Continuous phase iii. the type of colloid (**6 marks**)

Q3. (a) . In tabular form, differentiate between lyophobic and lyophilic sols. **(4 marks)**

(b) Describe a simple test that could be used to determine whether a clear colourless mixture is colloidal or true solution **(4 marks)**

(c) (i) Differentiate between Langmuir and BET adsorption Isotherm **(3 marks)**

(ii) Outline any four assumptions each in deriving Langmuir and BET adsorption principles **(4 marks)**

(iii) Enumerate any five characteristics each of physical and chemical adsorption. **(5 marks)**

Q4(a). (i) Explain what is meant by the term ‘‘colloidal systems’’ (**6 marks**)

(ii) Review critically, the different types of techniques that could be applied to study such system (**4 marks**)

(iii) What types of information are derivable from such study? (**3 marks**)

(iv) Explain how such information may be used in the development of a consumer-based product. (**4½ marks**)

(b). Enumerate five factors that determine the extent of adsorption of gases by solids. (**2 ½ marks**)