KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
SUPPLEMENTARY EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE

COURSE CODE: SCH 341

COURSE TITLE: SURFACE AND COLLOIDAL CHEMISTRY

DURATION: 2 HOURS

DATE: 11/10/2018 **TIME:** 8 – 9AM

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of **4** printed pages. Please Turn Over

QUESTION ONE

a) What is a colloid? [1 mk]

b) Differentiate between multimolecular and macromolecular colloids. [4mks]

c) Explain why surface effects are important in colloidal systems. **[3mks]**

d) Discuss the physical properties of Colloidal Solutions. [4mks]

f) State three condensation methods used in preparing a colloidal solution [3 mks]

g) Explain the use of the following methods;

i. dialysis [2mks]

ii. ultracentrifuging [2mks]

iii. ultra filtration [2mks]

h) State four conditions for Stabilization Mechanisms of foams. [4mks]

i) Explain five Applications of Colloids. [5mks]

QUESTION TWO

a) State two types of emulsions. [2mks]

b) Classify the following as aerosols or foam;-

Smoke, froth, dust, fog. [4mks]

c) Describe briefly how an emulsion can be prepared. [4mks]

d) State four techniques for breaking up emulsions. [4mks]

e) Discuss the various methods of testing the type of emulsion [6mks]

QUESTION THREE

a) Explain the following terms;

i) Electrophoresis [2mks]

ii) peptization [2mks]

b) Explain Four causes of electrical charge on the colloidal particles. [8 Marks]

c) State five factors affecting coagulation of sols. [4mks]

d) Explain 2 ways by which coagulation of sols occur. [4mks]

QUESTION FOUR

a) What is adsorption? [1mk]

b) Discuss the free energy change during adsorption. [3mks]

c) Distinguish between Physical and Chemical Adsorption. [3mks]

d) Calculate the amount of adsorption using Freundlich isotherm of the solute on activated charcoal in which the Slope value n = 0.2 and the distribution coefficient is k = 0.19. The equilibrium concentration of the adsorptive is 0.12. [3mks]

e) The data given below are for the adsorption of nitrogen on alumina at 77.3 K.

P/ (torr)	37.67	74.20	114.54	142.0	185.34
V (cm^3/g: STP)	23.14	28.1	33.1	36.35	41.49

Using **BET** adsorption isotherm, find V_{mono} and hence surface area of alumina (m^2/g).

(At 77.3 K, saturation pressure, P* = 733.59 torr, constant C= 30.18, 1 mole of gas at STP = 22400cm^3, Contact area of nitrogen molecule = 1.62 x $10^{-19}m^2$) [10mks]

QUESTION FIVE

a) Explain two types of Catalysis [2marks]

b) Mention four characteristics of enzyme catalysis. [4mks]

c) Using the proposed models, discuss the mechanism of enzyme catalysis. [10mks]

d) State any four applications of adsorption. [4mks]