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KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR**

FOR THE DEGREE OF BACHELOR OF SCIENCE

**THIRD YEAR SECOND SEMESTER
(Supplementary Examination)**

COURSE CODE: SCH 341

COURSE TITLE: SURFACE AND COLLOIDAL CHEMISTRY

TIME: 2 HOURS

DATE: 21ST SEPTEMBER 2017 TIME: 8 – 10 Am

INSTRUCTIONS TO CANDIDATES

This paper consists of FIVE questions. Answer question ONE which is COMPULSORY (30 marks) and any other TWO questions (20 marks each).

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This paper consist of 3 printed pages

Question 1

- a) What is a colloid? [1 mk]
- b) State three general classifications of colloidal systems. [3mks]
- c) Explain the following types of colloidal dispersion;
- Multimolecular colloids. [2mks]
 - Macromolecular colloids. [2mks]
- d) Using examples distinguish between continuous Medium and dispersed phase for a colloid. [3mks]
- e) State four physical properties of colloidal solutions [4mks]
- f) State four condensation methods used in preparing a colloidal solution [4mks]
- g) Explain the use of the following methods;
- Dialysis [2mks]
 - Ultracentrifuging [2mks]
 - Ultra filtration [2mks]
- h) State five Applications of Colloids. [5mks]

Question 2

- a) For each of the following, state whether the statement is True or False. If false, explain why.
- All colloidal systems are thermodynamically unstable. [2mks]
 - All foams consist of a gas dispersed in a liquid. [2mks]
 - Electro-osmotic flow is related directly to the streaming potential developed in the capillary. [1mk]
- b) State two types of emulsions. [2mks]
- c) Classify the following as aerosols or foam;-

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

- d) Describe briefly how an emulsion can be prepared. [4mks]
- e) State five techniques for breaking up emulsions. [5mks]

Question 3

- a) Explain the term 'peptization' [2mks]
- b) What is the cause of peptization? [2mks]
- c) State Four causes of electrical charge on the colloidal particles. [4Mks]
- d) State five factors affecting coagulation of sols. [4mks]

e) Explain TWO ways by which coagulation of sols occur. [4mks]

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

Question 4

a) What is adsorption? [1mk]

b) Explain what happens to ΔH , ΔS and ΔG during the process of adsorption. [3mks]

c) State four Differences between Physical and Chemical Adsorption. [4mks]

d) State three applications of Langmuir adsorption isotherm.[3mks]

e) State two types of Catalysis

f) Mention three characteristics of enzyme catalysis. [3mks]

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

Question 5

- a)
- i. Using the formula, explain what is meant by the terms mass average and number average molecular weights of a colloidal system. [4mks]
 - ii. How do the two terms in(a) define the polydispersity of the colloidal system? [1 mk]
 - iii. A certain polymer has 15% of its molecules having a mass of 10 kg/mol, 20% of its molecules having a mass of 20 kg/mol, 50% of its molecules with a mass of 25 kg/mol, and 15% of its molecules having a mass of 35 kg/mol. Is the system monodisperse? Explain. [8mks]
- b) State four differences between hydrophilic sols and hydrophobic sols.[4mks]
- c) Describe the cleansing action of soaps. [3mks]