



UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
CHEMISTRY AND BACHELOR OF SCIENCE IN INDUSTRIAL CHEMISTRY**

CHEM 326: COLLOID AND SURFACE CHEMISTRY

STREAMS: BSC CHEMISTRY AND INDUSTRIAL CHEMISTRY

TIME: 2 HOURS

DAY/DATE: MONDAY 05/07/2021

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS:

- **ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS.**

QUESTION ONE (30 MARKS)

- a) Define colloid science and give an example of a colloidal systems (2 marks)
- b) Differentiate between the following
- i) True solutions and colloidal solution (2 marks)
 - ii) Dispersed phase and Dispersion medium (2 marks)
 - iii) Hydrosol and latex (2 marks)
- c) List three factors determining the rate of particle growth. (3 marks)
- d) Briefly discuss the three classes of scattering of light by independent particles. (6 marks)
- e) Give three classification of pores according to their widths. (3 marks)
- f) Using a suitable diagram explain adsorption hysteresis. (3 marks)
- g) Define chemisorption. (1 mark)
- h) Define detergency. (1 mark)
- i) Using a suitable equation briefly discuss the manufacture of soaps. (2 marks)
- j) i) Explain the term Surface tension. (1 marks)
- ii) Using an equation give the surface tension of water. (3 marks)

QUESTION TWO (20 MARKS)

- a) Using a suitable example give three ways in which colloids are classified. (6 marks)
- b) Using an equation define the number-average relative molecular mass and a mass-average relative molecular mass (4 marks)
- c) Briefly discuss the following methods of separation of colloidal particles:
- k) Dialysis (3 marks)
- ii) Ultrafiltration (3 marks)
- d) Give four advantages of light-scattering over other alternative techniques of particle-size analysis. (4 marks)

QUESTION THREE (20 MARKS)

- a) i) Define the Critical Micelle Concentration (c.m.c) (1 mark)
- ii) Briefly discuss three factors affecting critical micelle concentration. (6 marks)
- b) Using a suitable equation explain the following isotherm equations:
- i) Langmuir (3 marks)
- ii) Brunauer, Emmett and Teller (BET) (3 marks)
- c) Explain wetting briefly and give two types of wetting. (2 marks)
- d) Give two complications associated with contact angle measurements. (2 marks)
- e) Briefly discuss water repellency. (3 marks)

QUESTION FOUR (20 MARKS)

- a) Using a suitable diagram discuss three types of Brunauer classification of adsorption isotherm. (6 marks)
- b) Give two drawbacks of soaps as detergents and explain how these drawbacks are offset (4 marks)
- c) Briefly discuss three properties of a satisfactory detergent. (3 marks)
- d) Briefly explain the electric double layer. (3 marks)
- e) Briefly discuss two electrokinetic phenomena. (4 marks)
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