

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

CHIN 323: INDUSTRY FORMULATION CHEMISTRY AND TECHNOLOGY

STREAMS: BSC. CHIM

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 23/04/2025

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS

- Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- Briefly explain the following terms in relation to formulation chemistry:
 - Microemulsions (2 marks)
 - Nano emulsions (2 marks)
 - Foams (2 marks)
- Differentiate between anionic and cationic surfactants. (3 marks)
- Explain the composting process of packaging materials. (4 marks)
- Discuss the objective and subjective product evaluation techniques. (6 marks)
- Using suitable examples discuss two industrial applications of emulsions. (2 marks)
- I. Define chemical product design. (1 mark)
II. Discuss the procedures involved in designing a new product from natural raw materials. (4 marks)
- Discuss two types of claims on pharmaceutical formulations. (4 marks)

QUESTION TWO (20 MARKS)

- a) Discuss two types of multiple emulsions. (4 marks)
- b) Using suitable examples discuss two methods of preparing latexes. (4 marks)
- c) Briefly discuss three methods of formulation analysis. (6 marks)
- d) Briefly discuss the following breakdown processes in emulsions:
 - i) Creaming and Sedimentation (2 marks)
 - ii) Flocculation (2 marks)
 - iii) Ostwald Ripening (Disproportionation). (2 marks)

QUESTION THREE (20 MARKS)

- a) Discuss smart packaging designs in cosmetic products. (8 marks)
- b) Discuss the package characteristics and risk assessment of cosmetic products. (3 marks)
- c) Describe the formulation constraints in the manufacture of paints. (4 marks)
- d) Give three differences between quality assurance and quality control. (3 marks)
- e) Discuss challenges of product formulation in cosmetic industry. (2 marks)

QUESTION FOUR (20 MARKS)

- a) State the basic requirements of good manufacturing practices. (4 marks)
 - b) Discuss two methods used for preparation of suspensions. (4 marks)
 - c) Discuss the importance of labelling and state the labelling requirements for cosmetic products. (5 marks)
 - d) Discuss the challenges of ingredient substitution in pesticide industries. (4 marks)
 - e) Write short notes on recycling and reworking of detergent formulations. (3 marks)
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