



UNIVERSITI KUALA LUMPUR  
MALAYSIAN INSTITUTE OF CHEMICAL AND BIO-ENGINEERING TECHNOLOGY

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**FINAL EXAMINATION**  
**OCTOBER 2025 SEMESTER**

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COURSE CODE : CBB40703  
COURSE TITLE : FORMULATION OF COSMETICS AND HEALTHCARE PRODUCTS  
PROGRAMME NAME : BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY  
(BIOPROCESS) WITH HONOURS  
DATE : 28 JANUARY 2026  
TIME : 9:00AM - 12:00PM  
DURATION : 3 HOURS

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

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THERE ARE 4 PAGES OF QUESTIONS INCLUDING THIS PAGE

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**SECTION A (Total: 100 marks)**

Answer **FOUR (4)** questions.

Please use the answer booklet provided.

**Question 1**

*Stratum corneum* plays a key role in regulating permeation of active ingredients into the deeper dermis layer.

- (a) Discuss **FOUR (4)** types of permeation pathways for an active ingredient to penetrate the *Stratum corneum*.

(20 marks)

- (b) Illustrate the permeation pathways explained in part (a) above.

(5 marks)

**Question 2**

A client wants to develop a new serum focusing on hydrating and brightening. The client specifies that the product must be effective, safe, and suitable for all skin types.

- (a) Outline a detail formulation by including the active and supporting ingredients with their roles.

(15 marks)

- (b) Analyse the NPRA labelling requirements by listing the mandatory information that must be included on the skincare product packaging.

(10 marks)

**Question 3**

A nutraceutical company wanted to come out with a supplement containing turmeric powder that focuses on anti-inflammatory.

- (a) Determine the most appropriate dosage form for the product and justify your decision with formulation-based reasoning.

(10 marks)

- (b) Discuss the challenges face in development of nutraceutical products.

(15 marks)

**Question 4**

Nanotechnology is broadly used in product formulation.

- (a) Explain **FIVE (5)** benefits of nanoemulsion.

(10 marks)

- (b) Dendrimers and nanotubes are types of nanotechnology used in cosmetic formulation. Differentiate these two nanostructures with appropriate diagrams.

(15 marks)

**Question 5**

Product formulation consists of active and functional ingredients.

*Refer Below - Figure1 : Ingredient List .*

Water ①, Niacinamide ①, Glycerin ①, Betaine ①, Butylene Glycol ①, Biosaccharide Gum-1 ①, Dimethicone ①, Cyclopentasiloxane ①, Carbomer ①, Cyclohexasiloxane ①, Bisabolol ①, Aminomethyl Propanol ①, Sodium Polyacrylate ①, Xanthan Gum ①, Disodium EDTA ①, Sodium Hyaluronate ①, Diethylhexyl Syringylidenemalonate ①, Trideceth-6 ①, PEG/PPG-18/18 Dimethicone ①, Mandelic Acid ①, Melia Azadirachta (Neem) Leaf Extract, Caprylic/Capric Triglyceride ①, PEG-40 Hydrogenated Castor Oil ①, Polysorbate 20 ①, Melaleuca Alternifolia (Tea Tree) Leaf Oil ①, Ascorbyl Glucoside ①, Salicylic Acid ①, Zingiber Officinale (Ginger) Root Extract ①, Fragrance ①, Phenoxyethanol ①, Chlorphenesin ①

*Read more on how to read an ingredient list >>*

Figure 1: Ingredient List

- (a) Select **FIVE (5)** active ingredients from the list and suggest their effects on human skin. (10 marks)
- (b) Identify **FIVE (5)** excipients and their functions from the given list. (10 marks)
- (c) Suggest the type of product base on the ingredients listed above. (5 marks)

**END OF EXAMINATION PAPER**

