



UNIVERSITI KUALA LUMPUR
ROYAL COLLEGE OF MEDICINE PERAK

FINAL EXAMINATION
MARCH 2026 SEMESTER

COURSE CODE : RCB20203
COURSE NAME : PHARMACEUTICAL TECHNOLOGY I
PROGRAMME NAME : BACHELOR IN PHARMACEUTICAL TECHNOLOGY
(HONOURS)
DATE : 30 JUNE 2026
TIME : 2.30 PM – 4.30 PM
DURATION : 2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read CAREFULLY the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of TWO (2) sections; Section A and Section B.
4. Answer ALL questions in Section A. For Section B, answer THREE (3) questions WITH AT LEAST ONE (1) question from question 3 or question 4.
5. Please write your answers on the OMR answer script and answer booklet provided.
6. Answer all questions in English language ONLY.

THERE ARE 9 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

I) MULTIPLE CHOICE QUESTIONS (20 marks)

INSTRUCTION: Answer ALL questions.

Use the OMR sheet provided.

1. Select the **CORRECT** definition of a dosage form in pharmaceutical science.
 - A. The pure chemical drug substance is administered without any additives.
 - B. The active ingredients and excipients that can be administered by appropriate route.
 - C. The active pharmaceutical ingredient is in its crystalline state.
 - D. The compounding formula is used exclusively in hospital pharmacies.
 - E. The drug substance that has been chemically modified for stability.
2. Select the most critical requirement to distinguish intravenous products from other dosage forms?
 - A. The product must be formulated as an oil-in-water emulsion.
 - B. The product must contain a preservative.
 - C. The product must be free of all excipients.
 - D. The product must be sterile.
 - E. The product must have a pH of exactly 7.4.
3. Choose the **CORRECT** instrument to measure different physical forms of a drug substance.
 - A. Nuclear magnetic resonance
 - B. Densitometer
 - C. Dynamic scanning calorimetry
 - D. X-ray diffraction
 - E. Ultraviolet visible spectroscopy

4. Choose the **CORRECT** characteristics of paracetamol which falls under the Biopharmaceutical Classification System (BCS) class 1.
- A. Medium solubility, medium permeability
 - B. Low solubility, high permeability
 - C. Low solubility, low permeability
 - D. High solubility, low permeability
 - E. High solubility, high permeability
5. Identify the **CORRECT** statement to distinguish a monophasic liquid dosage form from a biphasic liquid dosage form?
- A. Monophasic forms are always intended for external use only, while biphasic forms are for internal use.
 - B. Monophasic forms consist of a homogeneous single-phase system with all components completely dissolved, whereas biphasic forms contain two distinct phases.
 - C. Monophasic forms require shaking before use to ensure dose uniformity, while biphasic forms do not.
 - D. Monophasic forms can only use aqueous solvents, while biphasic forms use only non-aqueous solvents.
 - E. Monophasic forms have a longer shelf life than biphasic forms because they contain preservatives.
6. Choose the major difference between liniments and lotions based on their application.
- A. Liniments are intended to be inhaled, while lotions are intended to be strokes.
 - B. Lotions are intended to be rubbed vigorously into the skin, while liniments should only be applied with light strokes or dabbed.
 - C. Liniments are typically rubbed onto the skin, while lotions are applied without friction.
 - D. Lotions are used exclusively for systemic effects, whereas liniments are only used for local effects on the stratum corneum.
 - E. Liniments must be sterile preparations due to their application on broken skin, while lotions are non-sterile.

7. Select the **CORRECT** characteristic of a simple mixture for internal administration.
- A. Contains insoluble particles only.
 - B. Contains soluble ingredients only.
 - C. Contains slightly soluble solids only.
 - D. Contains precipitate-forming liquids only.
 - E. Contains insoluble particles in colloidal suspension.
8. What are the recommended storage conditions for syrups and elixirs?
- A. In a humid environment at room temperature.
 - B. In a warm place away from light.
 - C. In open containers at room temperature.
 - D. In a dried, well-closed bottle at temperatures not exceeding 25°C.
 - E. In a freezer at -20°C.
9. After drug discovery or synthesis, the next essential step in pharmaceutical development is to _____.
- A. conduct analytical method validation for the drug product
 - B. market the drug directly to patients
 - C. formulate the drug into a suspension dosage form
 - D. select glass as the packaging material
 - E. evaluate its therapeutic efficacy and safety
10. The study of the physical and chemical principles underlying the design of suspension and emulsion dosage forms is known as _____.
- A. dosage form design
 - B. compounding
 - C. physical pharmacy
 - D. pharmaceutical technology
 - E. pharmaceuticals

11. A solution differs from an emulsion in that _____.
A. it is the phase in which dispersion occurs
B. it consists of two immiscible liquid phases
C. it contains a dispersed phase and a continuous phase
D. a type of liquid preparation containing undissolved or immiscible drug distributed throughout a vehicle
E. it requires the presence of alcohol
12. Disperse system is _____.
A. a non-homogeneous single-phase system.
B. a type of liquid preparation in which the drug is completely dissolved in a vehicle
C. a homogeneous single-phase system
D. a type of liquid preparation containing undissolved or immiscible drug distributed throughout a vehicle
E. a system in which all components are present in equal proportions
13. Select the **CORRECT** statements regarding semisolid dosage forms.
I. Ointments, creams, and gels are classified as semisolid dosage forms.
II. Semisolid dosage forms are intended for topical application to the skin or mucous membranes.
III. Semisolid dosage forms may be applied directly to the skin for local or systemic effects.
IV. Semisolid dosage forms generally do not require the addition of preservatives.
A. I and II
B. II and III
C. I, II, and III
D. I, III, and IV
E. II, III, and IV

14. Ointments ____.
- A. are semisolid preparations intended for external application to the skin or mucous membranes
 - B. contain more than 50% water or volatile components
 - C. are primarily oil-in-water emulsion systems
 - D. are designed to melt completely at room temperature
 - E. contain solid particles that produce a gritty texture
15. Which of the following are formulation components of an oral liquid dosage form?
- I. Active Pharmaceutical Ingredient (API)
 - II. Vehicle
 - III. Flavor
 - IV. Sweetener and taste-masking agent
- A. I and II
 - B. I and III
 - C. II and IV
 - D. I, II, and III
 - E. I, II, III, and IV
16. Which of the following are considered ideal properties of semisolid dosage forms?
- I. The drug should demonstrate high solubility within the vehicle to ensure uniform distribution.
 - II. The formulation must maintain physical and chemical stability over its shelf life.
 - III. The preparation must be compatible with the skin and non-irritating.
 - IV. The dosage form should offer ease of application and be satisfying to the user.
- A. I and II
 - B. I and III
 - C. II and IV
 - D. I, II, and III
 - E. II, III, and IV

17. Which of the following are classified as semisolid dosage forms?
- I. Gels
 - II. Elixirs
 - III. Creams
 - IV. Ointments
 - A. I and II
 - B. I and III
 - C. II and IV
 - D. I, II, and IV
 - E. I, III, and IV
18. Which of the following are components in cream formulation?
- I. Flavoring agent
 - II. Emulsifying agent
 - III. Aqueous or oily vehicle
 - IV. Active Pharmaceutical Ingredient (API)
 - A. I and II
 - B. II and III
 - C. I, II, and IV
 - D. II, III, and IV
 - E. I, II, III, and IV
19. Which statement best describes 'eutectic mixture'?
- A. A mixture of incompatible drugs that form a precipitate.
 - B. A low melting point solid that liquefies when mixed.
 - C. A stable complex formed between drugs and excipients.
 - D. An insoluble drug complex with metals.
 - E. A solution with optimal pH for drug stability.
20. Which of the following is an antioxidant used to prevent oxidation of drugs?
- A. Sodium chloride
 - B. EDTA
 - C. Vitamin E
 - D. Magnesium carbonate
 - E. Light-absorbing agents

II) SHORT ANSWER QUESTIONS (20 marks)**INSTRUCTION: Answer ALL questions in the answer booklet provided.****Each question carries TWO (2) marks.**

1. Define bioavailability and state **ONE (1)** factor that can affect it.
2. Distinguish between a pharmaceutical equivalent and a pharmaceutical alternative.
3. What is a delayed release dosage form? Give **ONE (1)** example.
4. State **TWO (2)** techniques from the chemical modification method to improve solubility of drug.
5. What is the definition of Log P behaviour of drug molecules?
6. Describe **TWO (2)** tests used to identify the type of emulsion.
7. List **FOUR (4)** types of ointment bases.
8. Give **ONE (1)** example of a semisolid dosage form and **ONE (1)** example of a liquid dosage form that are classified as a dispersed system.
9. List **TWO (2)** advantages of using suppositories for drug administration.
10. State **TWO (2)** properties of ideal suppositories base.

SECTION B: MODIFIED ESSAY QUESTIONS (Total: 60 marks)

INSTRUCTION: This section consists of **FOUR (4)** questions.

You are required to answer **THREE (3)** questions in the answer booklet provided.

Question 1 and 2 are COMPULSORY.

Answer EITHER Question 3 OR 4.

Question 1

- (a) Explain the differences between two separate existence forms of moisture in solid drug. (5 marks)
- (b) Explain the method of dispensing in diffusible mixtures. (5 marks)
- (c) Explain the physical properties of a well-formulated suspension and emulsion. (5 marks)
- (d) Describe the physiological factors of colonic content that influence rectal absorption of drugs. (5 marks)

Question 2

- (a) pH and pKa are two important parameters in pre-formulation studies to study the drug inherent properties. Explain the relationship between pH and pKa. (5 marks)
- (b) Explain the advantages and disadvantages of water as choice of solvent. (5 marks)
- (c) Explain **FIVE (5)** characteristics of a deflocculated suspension system. (5 marks)
- (d) Describe **FIVE (5)** advantages of rectal drug administration. (5 marks)

Question 3

- (a) Explain the challenges encountered during the pilot scale manufacturing of semisolid dosage forms. (10 marks)
- (b) Explain pharmaceutical incompatibility and classify its **THREE (3)** main types. (5 marks)
- (c) Describe hydrolysis as a form of chemical incompatibility. Suggest **TWO (2)** methods to prevent hydrolysis in liquid pharmaceutical formulations. (5 marks)

Question 4

- (a) Suspensions can be utilized in both oral and topical drug delivery. Justify this statement. (10 marks)
- (b) Explain **FOUR (4)** types of pharmacodynamic interactions with **ONE (1)** combination drug example. (10 marks)

END OF EXAMINATION PAPER