



Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Science

IPS 3253 – Drug Release and Novel Drug Delivery Systems

Batch – 06

3rd year 2nd semester

End Semester SEQ Examination

Date: 17th November 2025

Time: 09.00 a.m. – 12.00 noon (Three hours)

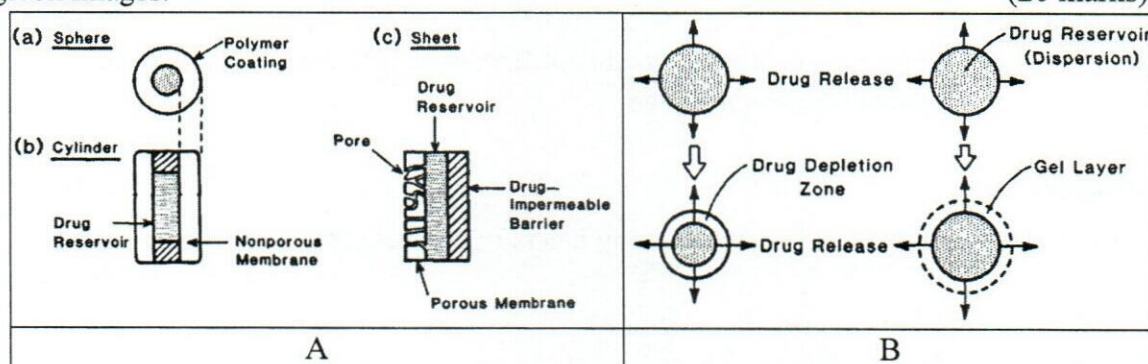
INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01

(100 marks)

- 1.1 Identify the type of controlled-release drug delivery systems (CRDDS) A & B from the given images. (20 marks)



- 1.2 Outline the design of micro-reservoir partition CRDDS using a diagram. (30 marks)
- 1.3 State **five (05)** biopharmaceutical factors to be considered with respect to routes of administration when designing a CRDDS. (20 marks)
- 1.4 Relate the effect of elimination half-life when selecting a drug candidate for CRDDS. (30 marks)

Question 02

(100 marks)

- 2.1. Select **five (05)** examples of natural polymers and relate their major functions as excipients. (25 marks)
- 2.2. Critically analyze why nanoparticles are significant in drug delivery. (20 marks)
- 2.3. Relate factors that may affect the glass transition temperature of a polymer. (25 marks)
- 2.4. Outline the methods for drug loading into erythrocytes. (30 marks)

Question 03**(100 marks)**

- 3.1. Select and compare **two (02)** controlled oral drug delivery systems. (30 marks)
- 3.2. Compare the advantages and disadvantages of controlled oral drug delivery systems. (20 marks)
- 3.3. Outline the methods by which the release rate is controlled in dissolution-controlled drug delivery systems. (30 marks)
- 3.4. Write a short note on "Ion-exchange resin systems" used in controlled oral drug delivery. (20 marks)

Question 04**(100 marks)**

- 4.1. How does excessive swelling or hydration of the polymer affect bioadhesion? (20 marks)
- 4.2. Discuss the importance of permeation enhancers in mucoadhesive drug delivery. (25 marks)
- 4.3. Analyze the effect of mucociliary clearance on muco-adhesive drug delivery through nasal route. (25 marks)
- 4.4. Illustrate **five (05)** types of buccal tablet designs with suitable diagrams. (30 marks)

Question 05**(100 marks)**

- 5.1. Draw the basic structure of a liposome and label the features. (20 marks)
- 5.2. Classify liposomes based on method of preparation. (25 marks)
- 5.3. Discuss the process flow of manufacturing of liposomes by reverse-phase evaporation method. (25 marks)
- 5.4. State **six (06)** evaluation characteristics of liposomes and **one (01)** analytical technique / method of characterization **for each**. (30 marks)

Question 06**(100 marks)**

- 6.1. Outline the function of each following layers of a transdermal drug delivery system. (4 × 5 marks)
 - 6.1.1. Occlusive backing membrane
 - 6.1.2. Drug reservoir
 - 6.1.3. Drug release membrane
 - 6.1.4. Adhesive layer
- 6.2. State how do the solid microneedles facilitate transdermal drug delivery. (20 marks)
- 6.3. Relate how pH of the permeate molecule affects transdermal drug delivery. (30 marks)
- 6.4. Illustrate the differences between a reservoir system and a matrix system in transdermal drug delivery. (30 marks)