Charles Darwin University

Final Examination

Family Name						
Given Name/s						
Student Number						
Teaching Period	Semester 2, 2017					

PHA302 – Applied Pharmaceutics	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes

INSTRUCTIONS TO CANDIDATES

Please ensure that your Name and Student Number are indicated clearly on your Answer Booklets and at the top of the multiple choice answer sheet provided.

There are 2 (**TWO**) sections (A and B) for this paper:

Section A contains Forty (40) Multiple Choice Questions. Answer all questions on the Faculty/School Multiple Choice Answer Sheet supplied. Total marks allocated: Forty (40). Suggested time allocation: ONE hour (60 minutes).

Section B contains Five (5) Short Answer and Calculation Questions. Answer all questions in the 20-page Booklet provided. Show all relevant steps in your calculations and include all relevant units in your answers. Total marks allocated: Sixty (60). Suggested time allocation: TWO hours (120 minutes).

Total marks for this exam paper: 100

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted.	1 x 20 Page Book 1 x Scrap Paper Faculty/School Multiple Choice Answer Sheet

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Section A

Multiple Choice Questions
Total No of Marks for this section: 40
Answer ALL Forty (40) questions

This section should be answered on the Faculty/School Multiple Choice Answer Sheet provided. Please ensure that your name and student number have been written on the examination paper and on the answer sheet.

Suggested Time allocation for Section A: **60 mins**

END of Section A

Section B
Short Answer and Calculation Questions
Total Marks for this section: 60
Answer ALL Five (5) questions
This section should be answered in the 20-page Answer Booklet provided.
Marks for each question are indicated.
Show all relevant steps in your calculations and include all relevant units in your answers.
Suggested Time allocation for Section B: **120 minutes**

Question 1 (12 marks)

a What factors are considered in studying Accelerated Stability Testing (AST)?

(3 marks)

b How can you predict shelf-life and expiry date of a drug product from AST data?

(3 marks)

c When hydrogen peroxide degrades, oxygen gas is formed. It was found that the amount of oxygen yet to be liberated after 65 minutes was 9.6 mL from an original amount of oxygen yet to be liberated of 57.9 mL. Calculate the first order rate constant and shelf life, and determine how much oxygen remained unliberated after 25 minutes.

(4 marks)

d Briefly describe the potential consequences if a pharmaceutical product is not stable.

(2 marks)

Question 2 (12 marks)

a What is dilatant flow? Explain why suspensions containing high percentage (>50%) of deflocculated particles exhibit dilatant flow?

(4 marks)

b Draw accurately the rheograms for Newtonian flow, plastic flow, pseudoplastic flow and dilatant flow. Provide at least one example of each type of liquids.

(4 marks)

c The viscosity of human plasma at 37 ^{o}C is 12 cps. Assuming that plasma behaves as a Newtonian fluid, determine the viscosity of plasma required for an infusion that is kept at room temperature (25 ^{o}C). The activation energy of plasma is 4.25 x 103 cal/mole and universal molar gas constant is 1.987 cal/mole.

(4 marks)

Question 3 (12 marks)

a Outline the ideal physicochemical parameters of an API for formulation in a transdermal drug delivery system

(2.5 marks)

b Describe a transdermal patch, using a diagram to explain the role of each layer and ingredient

(4 marks)

c Briefly explain why molecules of extreme aqueous vs lipid solubility and molecules of extreme lipid vs aqueous solubility are unsuitable candidates for transdermal drug delivery. Why are protein drugs “challenging” candidates for transdermal drug delivery?

(4 marks)

d What is the “shunt” route of transdermal drug delivery?

(1.5 marks)

Question 4 (12 marks)

a What types of materials can be filled into hard gelatin capsules?

(2 marks)

b Illustrate different capsule sizes with their approximate volume capacity. What factors need to be considered when selecting an appropriate size of capsule shell?

(4 marks)

c Describe briefly the common ingredients used in soft gelatin capsules.

(3 marks)

d A pharmacist is making hard gelatin capsules using a hand filling machine. The formula was a powder granulation containing lactose and starch as excipients. For some reasons he increases the amount of starch (that absorb moisture) in the formulation. What will happen to these capsules after 2-3 months? Explain your answer.

(3 marks)

Question 5 (12 marks)

a Why is wet granulation technique used to manufacture tablets?

(2 marks)

b What are the common problems encountered during manufacturing of tablets? Explain the possible reasons that cause these problems.

(4 marks)

c Why enteric coated tablets are produced? What materials are used in enteric coatings?

(4 marks)

d How does effervescent tablet work? Illustrate their advantages.

(2 marks)

END of Section B

END of Exam Paper