CS/B.PHARM/SEM-6/PT-611/09

1. .....
Signature of Invigilator

2. .....
Signature of the Officer-in-Charge

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.PHARM/SEM-6/PT-611/09

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

PHARMACEUTICS (BIOPHARMACEUTICS & PHARMACOKINETICS) (SEMESTER - 6)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C				
Question Number																	***Total Marks***	***Examiner's Signature***
Marks Obtained																		

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Head-Examiner/Co-Ordinator/Scrutineer

6745 (09/06)

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SEMESTER - 6

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GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) Which of the following type of tablet dosage form undergoes comparatively quick dissolution ?

a) Sugar coated b) Enteric coated

c) Non-enteric film coated d) None of these.

ii) Site-IV on human serum albumin is known as

a) Lamoxifen binding site b) Tamoxifen binding site

c) Propoxifen binding site d) Methotrexate binding site.

iii) Kinetics of capacity-limited process is best described by

a) Michaelis-Menten equation

b) Fick's equation

c) Noyes and Whitney equation

d) Hixson and Crowell's equation.

iv) Which of the following polymorphic form shows greater acqueous solubility ?

a) Metastable b) Aquastable

c) Nanostable d) Stable.

v) If *i.v.* bolus dose of a drug is 250 mg having elimination rate constant (K_E) 0·25/hr, find out AUC for the drug assuming one compartment model having volume of distribution as 20 litres, from the following :

a) 60 mg.hr/litre b) 30 mg.hr/litre

c) 50 mg.hr/litre d) Data inadequate. ☐

vi) Hixson and Crowell's cubic root law of dissolution is

a) $w_0^{1/3} - w^{1/3} = kt$ b) $w_0 - w = kt$

c) $w_0^{1/3} - w^{1/3} = k$ d) $w_0^{1/2} - w^{1/2} = kt$. ☐

vii) The influence of route of administration on drug's bioavailability is generally in which of the following order ?

a) Oral > parenteral > rectal > topical

b) Parenteral > rectal > oral > topical

c) Rectal > topical > parenteral > oral

d) Parenteral > oral > rectal > topical. ☐

viii) Gastric emptying is

a) the passage from liver to kidney

b) the passage from stomach to small intestine

c) the passage from duodenum to jejunnum

d) the passage from caecum to colon. ☐

ix) The mechanism of gastrointestinal absorption of glucose is

a) active transport b) facilitated diffusion

c) pore transport d) passive diffusion. ☐

x) The equation for zero order half-life is

a) C_0 / k_0 b) $0{\cdot}693 / k_0$

c) $C_0 / 2k_0$ d) $2C_0 / k_0$. ☐

xi) Enhancement of half-life of penicillin by probenecid is due to interaction during

a) absorption b) distribution

c) metabolism d) excretion. ☐

xii) B-cyclodextrin increases the solutbility of poorly soluble drugs by

a) Cosolvency b) Solubilisation

c) Inclusion complexation d) Chemical modification. ☐

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following questions. 3 × 5 = 15

2. What does Area under Plasma level-time Curve (AUC) represent ? Derive an expression for determination of AUC after extra vascular administration of a drug which exhibit one-compartment characteristics.

3. What is gastric emptying ? Write the factors affecting gastric emptying.

4. Prove that the half-life of a first order process is independent of initial drug concentration.

5. What do you mean by drug interactions ? Explain the reasons for alteration of drug absorption due to drug interaction.

6. What are the applications and limitations of method of residuals ? What is flip-flop phenomenon and when is it observed ?

7. Name the specialized barriers to distribution of drugs. Describe the anatomy and physiology of blood brain barrier.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following questions. 3 × 15 = 45

8. a) What do you mean by one-compartment open model ? Derive an expression for plasma concentration as a function of time after extra vascular administration of a drug with one-compartment characteristics and first order absorption process. Also explain about the assessment of pharmacokinetic parameters. 2 + 5 + 4

b) After oral administration of paracetamol (500 mg), the equation that best fits its pharmacokinetic is $C = 1{\cdot}5\ (e^{-0{\cdot}25\,t} - e^{-1{\cdot}5\,t})$. Assuming one-compartment kinetics, find out peak time, peak plasma concentration and plasma concentration after 1 hr administration of drug. (Fraction bioavailable = 0·4)

4

9. a) Mention the physico-chemical factors that effect drug absorption. Describe how particle size, polymoprhism, and pseudo polymorphism affect absorption of drugs. 2 + 2 + 2 + 2

b) Enumerate pH partition hypothesis and its limitations. 1 + 3

c) How micronization of phenobarbital will affect its dissolution ? Explain. 3

10. a) Enumerate the criteria for obtaining valid urinary excretion data. Explain about the methods for computation of first order elimination and excretion rate constants (K_E and K_e) from urine data mathematically. 2 + 10

b) Among anhydrous ampicillin and ampicillin trihydrate, which one is having higher aqueous solubility ? Justify your answer with proper reason. 3

11. What is protein binding of drug ? Write a short note on Human Serum Albumin. What are the significance of protein binding of drugs ? What is Scatchard plot ?

2 + 4 + 7 + 2

12. a) Discuss Wagner-Nelson method for the estimation of K_a from plasma concentration time data.

b) If the plasma concentration of diazepam after *i.v.* bolus administration was found to be 10·0 and 5·5 mcg/url at 2 and 4 hours respectively, assuming one compartment kinetics, calculate

i) half-life of the drug

ii) concetration of drug in plasma at zine zero

iii) the V_d if dose administered was 300 mg

iv) the total systemic clearance. 7 + 8

13. a) What are the causes of non-linear Pharmacokinetics ? Describe Michaelis-Menten equation to indicate kinetics of capacity limited process.

b) Discuss different factors which affect bioavailability of a drug. (3 + 5) + 7

END