Name: Enrolment No:	UPES UNIVERSITY OF TOMORROW

UPES

End Semester Examination, May 2025

Course: Biopharmaceutics and Pharmacokinetics — **Semester : VI**

Program: B. Pharmacy — **Duration : 03 Hours**

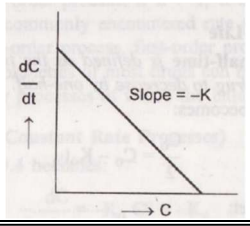
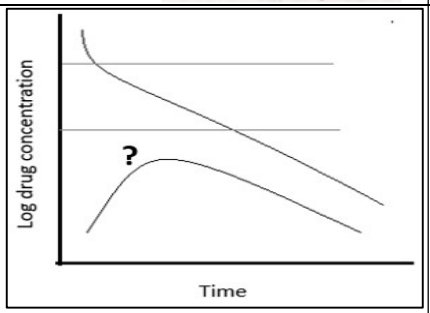
Course Code: BP604T — **Max. Marks: 75**

Instructions: Read all the questions carefully. Follow the instructions mentioned against each section.

SECTION A

(20Qx1M=20 Marks)

S. No.		Marks	COs
Q 1	Select the option that corresponds to the major difference between Facilitated diffusion and Passive diffusion. A. Carrier mediated transport B. Downhill transport C. Energy requirement D. Uphill transport	1	CO1
Q 2	If the drug has a very high volume of distribution, select the true statement about the drug. A. Drug is accumulated in organs and tissues B. Drug may have high plasma protein binding property C. Drug is not bioavailable D. Drug distribution is limited to blood compartment	1	CO1
Q 3	_____ are most affected by displacement interactions in protein binding. A. Drugs bound less than 50% B. Drugs with high lipid solubility C. Drugs bound more than 95% D. Hydrophilic drugs	1	CO1
Q 4	Define volume of distribution.	1	CO1
Q 5	The distribution of drug through blood-brain barrier is an example of _____ distribution. A. perfusion limited B. tissue permeability limited B. dissolution limited D. diffusion limited	1	CO1
Q 6	State the formula for extraction ratio.	1	CO2
Q 7	The following are steps of renal excretion except _____ . A. Tubular reabsorption B. Tubular Secretion C. Glomerular filtration D. Tubular filtration	1	CO2
Q 8	_____ drugs follow pulmonary route of excretion. A. Liquid B. Liquid and hydrophilic C. Volatile D. Liquid and hydrophobic	1	CO2
Q 9	_____ is the major organ for drug metabolism. A. Kidney B. Liver C. Lung D. Spleen	1	CO2
Q 10	_____ is the role of Phase II reactions in drug metabolism.	1	CO2

	A. Hydrolysis of esters B. Reduction of functional groups C. Formation of water-soluble conjugates D. Oxidation of lipophilic drugs		
Q 11	State the significance of C_{max}.	**1**	**CO3**
Q 12	State the formula for calculation of loading dose.	**1**	**CO3**
Q 13	The i.v. bolus dosage is 100 mg and the plasma drug concentration is 0.5 mg/ml. What should be the volume of distribution? A. 200 mg/mL B. 200 L C. 200 mL D. 0.005 mg/mL	**1**	**CO3**
Q 14	Illustrate the mammillary models used for depicting pharmacokinetics.	**1**	**CO3**
Q 15	Half-life of the drug is the secondary pharmacokinetic parameter. A. True B. False	**1**	**CO3**
Q 16	In non-compartmental analysis, mean residence time is equal to _____. A. AUMC/AUC B. AUC/AUMC C. Dose / AUC D. 1/AUMC	**1**	**CO3**
Q 17	The given figure depicts_____.  A. Zero order kinetics B. First order kinetics C. Non-linear kinetics D. Saturation kinetics	**1**	**CO3**
Q 18	In the given picture, the marking "?" represents the drug concentration of which compartment?  A. The central compartment in a two compartment model B. The peripheral compartment in a two compartment model **C.** The central compartment in a one compartment model D. The peripheral compartment in a one compartment model	**1**	**CO4**
Q 19	Enlist any two examples of non-linearity observed in distribution.	**1**	**CO5**
Q 20	Non-linear kinetics can be best explained by _____ equation. A. Arrhenius B. Whitney's C. Michelis-Menten D. Fick's	**1**	**CO5**

SECTION B (20 Marks)
(2Qx10M=20 Marks)

Attempt 2 Question out of 3

Q 1	Discuss in detail the factors affecting drug distribution.	**10**	**CO1**
Q 2	After an IV bolus dose of 500µg, the data collected is shown in following table. By assuming one compartment open model, estimate the following parameters: **Concentration *versus* Time Data**	**10**	**CO3**

Time (hr)	1	2	3	4	6	8	10
Cp (mcg/ml)	72	51	33	20	14	9	4

	By assuming one compartment open model, calculate following parameters: a) Elimination rate constant (3 marks) b) Volume of distribution (3 marks) c) Total body clearance (2 marks) d) Half-life of drug (2 marks)		
Q 3	Write a short note on Phase II metabolism.	**10**	**CO2**
SECTION-C (35 Marks) **(7Qx5M=35 Marks)** **Attempt 7 Question out of 9**			
Q 1	Discuss the non-linearity observed in distribution and metabolism.	**5**	**CO5**
Q 2	Explain in detail the term "Renal Clearance".	**5**	**CO2**
Q 3	"Drug interactions can be employed for selective excretion of some drugs". Explain the statement with an example.	**5**	**CO2**
Q 4	Determine the total body clearance for a drug in a 70-kg male patient. The drug follows the kinetics of a one-compartment model and has an elimination half-life of 3 hours with an apparent volume of distribution of 100 mL/kg.	**5**	**CO3**
Q 5	Write a short note on blood-brain barrier.	**5**	**CO1**
Q 6	Explain the concept of two-compartment model with the help of graphs.	**5**	**CO4**
Q 7	Demonstrate any one method used to determine V_{max} and K_m in Michaelis-Menten equation	**5**	**CO5**
Q 8	Discuss any two non-oral routes of absorption.	**5**	**CO1**
Q 9	Explain the pharmacokinetics of one compartment open model iv infusion.	**5**	**CO3**