BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.PHARM **SEMESTER: II**
BRANCH: PHARMACY **SESSION: SP 2025**

SUBJECT: MPH202T ADVANCED BIOPHARMACEUTICS AND PHARMACOKINETICS

TIME: 3.00 Hours **FULL MARK: 75**

INSTRUCTIONS:

1. The missing data, if any, may be assumed suitably.
2. Before attempting the question paper, be sure that you have got the correct question paper.
3. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
5. Answer any five questions.

1a. Derive the equation to determine pharmacokinetic parameters for an extravascular administration following one compartment pharmacokinetic model. [7]

1b. From the following data of plasma drug concentration vs time, calculate the absorption rate constant by Wagner-Nelson method. Overall elimination rate constant is 0.20 hr^{-1}. No need of using any graph paper. [8]

Time (hr)	Plasma Concentration (mg/L)
0	0
1	18
2	38
3	59
4	69
5	80
6	65
8	52
10	40
12	28
18	16

2a. Write a short note on Sigma-minus method by which pharmacokinetic parameters are determined from drug concentration in urine vs time data of a drug administered as IV bolus dose following one compartment pharmacokinetic model. [7]

2b. 150 mg of a drug was administered by rapid IV injection to a 70-kg, healthy adult male. Blood samples were taken periodically after the administration of drug, and the plasma fraction of each sample was assayed for drug. The following data were obtained: [8]

Time (hr)	Plasma Concentration (mg/L)
0.25	56
0.5	35
1	24
1.5	18
2	14
4	6.9
8	3.2
12	2.1
16	1.2

Calculate all the pharmacokinetics parameters by assuming two-compartment open model.

PTO

3a.	Describe the various mechanisms of drug absorption through the gastrointestinal tract.	[7]
3b.	Describe the physicochemical properties of a drug that can influence its absorption and overall bioavailability.	[8]
4a.	Explain the role of the dosage form in gastrointestinal drug absorption with examples of solutions, suspensions, tablets, and capsules.	[7]
4b.	Discuss the biopharmaceutic considerations in the design of oral drug products. Include factors related to both the drug and the formulation.	[8]
5a.	Write a short note on formulation and processing factors affecting the performance of oral dosage forms	[7]
5b.	Explain the process and importance of developing an In Vitro–In Vivo Correlation (IVIVC). What are the different levels of correlation?	[8]
6a.	Write a short note on the Biopharmaceutics Classification System (BCS)-based biowaiver.	[7]
6b.	Explain the various methods of assessing bioavailability and bioequivalence of drug products.	[8]
7a.	Write the factors affecting the bioavailability of drugs, with specific examples wherever necessary.	[7]
7b.	Discuss the various methods to enhance the bioavailability of drugs.	[8]

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