

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

FIRST SEMESTER 2022-2023

PHA G612: Pharmacokinetics and Clinical Pharmacy

**Comprehensive Examination**

Maximum marks: 70

Date: 28/12/2022

Weightage: 35%

Duration: 180 min

Note:

- Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
- All parts of a question should be answered consecutively.
- Each answer should start from a fresh page.
- Assumptions made if any, should be stated clearly at the beginning of your answer.

No. of Pages	= 2
No. of Questions	= 9

**CLOSED BOOK**

- Q1. What is Mean Residence Time. Explain. [6 M]
- Q2. Explain, using appropriate diagram/s, the pharmacokinetic-pharmacodynamic modeling in a non-steady state condition. [6 M]
- Q3. What are Lineweaver-Burke and Wolf's Plots. [4 M]
- Q4. What is bioequivalence and therapeutic equivalence. Is it right to say that two formulations with the same average AUC are bioequivalent? Explain. [4 M]

**OPEN BOOK**

Q5. A drug was given at a dose of 650 mg and following data was obtained.

Time (h)	Concentration ( $\mu\text{g/ml}$ )
1	10
2	18
4	25
6	27
12	24
16	20
24	14
48	5
96	0.5

What would be the plasma concentration at 4 h after 2<sup>nd</sup> and 3<sup>rd</sup> dose, given regularly at an interval of 12 h. (Given:  $F=0.8$ ). [15 M]

Q6. Justify/Comment on the following [9 M]

- a. Sometimes a constant is not a constant and a variable is not a variable
- b. If the dose is doubled, the AUC becomes four times.
- c. More frequent and smaller doses are preferred over larger and less frequent doses.

Q7. A steady state was achieved after 8 h of continuous IV infusion at a rate of 6.5 mg/min. Considering the volume of distribution to be 12.8 L, determine the steady state concentration (in  $\mu\text{g/ml}$ ). What should be the initial faster infusion rate (in mg/min) to achieve the similar steady state within 3 h. [10 M]

Q8. Derive the formula to calculate the accumulation factor after multiple oral administration for a drug with a slower oral absorption. [8 M]

Q9. A drug was given at a dose of 250 mg IV bolus. If  $K_{12}$ ,  $K_{21}$ ,  $\alpha$  and  $\beta$  for the drug are 1.32, 0.8, 2.5 and  $0.18 \text{ h}^{-1}$ , respectively, calculate the concentration (in  $\mu\text{g/ml}$ ) of the drug after 2 h and 8 h post administration. (Given: Volume of distribution is 8 L) [8 M]

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