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

CLASS: M. PHARM. (PHARMACEUTICS) **SEMESTER: II**
BRANCH: PHARMACY **SESSION: SP2023**

SUBJECT: MPH202T ADVANCED BIOPHARMACEUTICS & 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 an equation with suitable illustration to calculate the steady state plasma concentration for a drug given by intravenous infusion that distributes in body as one compartment. [7]

1b. Justify that: "Amount of drug in the body is constant throughout the time course of drug administration with simultaneous IV bolus and intravenous infusion". [8]

2a. Derive residual method to estimate absorption rate constant and elimination rate constant for a drug given orally that is distributing in body as one compartment model. [7]

2b. Prove that when rate constants of absorption and elimination are equal, the max plasma concentration is independent on these constants and time at which Cmax occurs (i.e., Tmax), is the reciprocal of either K_a or K_E [8]

3a. Draw and discuss plasma concentration time plot for a drug given intravenously that is distributing in the body as two compartment model. [7]

3b. With suitable case studies demonstrate the importance of the volume of distribution and the reasons why it is referred to as the apparent volume of distribution? [8]

4a. A drug eliminated from the body by capacity-limited pharmacokinetics has a KM of 200 mg/L and a Vmax of 50 mg/h. If 600 mg of the drug is given to a patient by IV bolus injection, calculate the time for the drug to be 50% eliminated. If 400 mg of the drug is to be given by IV bolus injection, calculate the time for 50% of the dose to be eliminated. Explain why there is a difference in the time for 50% elimination of a 400-mg dose compared to a 320-mg dose. [7]

4b. Phenytoin was administered to a patient at dosing rates of 150 and 300 mg/d, respectively. The steady-state plasma drug concentrations were 8.6 and 25.1 mg/L, respectively. Find the KM and Vmax of this patient using DIRECT METHOD. What dose is needed to achieve a steady-state concentration of 11.3 mg/L? [8]

5a. Describe pH-partition theory of drug absorption with suitable example. [7]

5b. Demonstrate the passive diffusion process of drug absorption. [8]

6a. Write a short note on dissolution modelling. [7]

6b. Describe various dissolution profile comparison parameters. [8]

7a. Write a short note on in vitro-in vivo correlation (IVIVC). [7]

7b. Describe the circumstances where bioequivalence may be accessed by the in-vitro dissolution testing. [8]

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