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

CLASS: BPHARM **SEMESTER: VI**
BRANCH: PHARMACY **SESSION: SP2023**

SUBJECT: BP604T 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.**
4. **This question paper consists of (03) three parts. Read the part wise instructions before attempting the questions.**

PART-I
Objective type questions (Instruction: Answer all questions)

Q1. (10 x 2 = 20 Marks)

A.	If the drug concentration is high and absorbed through carrier mediated process, what will be the order of kinetics of its drug absorption?	CO2
B.	Give one example where drug is absorbed by the mechanism of ion-pair formation.	CO1
C.	Define absolute and relative bioavailability.	CO1
D.	Write the criteria for bio-equivalency.	CO2
E.	Classify pharmaceuticals based upon Biopharmaceutics Classification system.	CO1
F.	Write an equation to relate the time course of drug in plasma when given orally that distributes in body as one compartment model.	CO2
G.	Draw a plot of plasma concentration versus time when the drug is given simultaneous IV bolus and IV infusion considering one compartment model.	CO2
H.	What is the mathematical relationship between microconstants and hybrid constants for a drug given intravenously that distributes in body as per two compartment model.	CO2
I.	At Cmax, dc/dt is ……..	CO1
J.	When KE>>>Ka, the residual line slope is ……	CO2

PART-II
Short Answers
(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

Q2.	Derive the equation to determine area under the curve zero to infinity ($AUC_{0-\infty}$) for a IV dose administration.	CO3
Q3.	Describe the dissolution or release process according to apparent zero order rate kinetics.	CO2
Q4.	Write down a short note on In vitro-In Vivo correlation (IVIVC).	CO1
Q5.	Explain cross over study design with suitable example.	CO2
Q6.	Discuss method of trapezoidal rule to estimate area under the curve.	CO2
Q7.	Derive a method to estimate Absorption rate constant using method of residuals when the drug is given orally conferring one compartment model.	CO3
Q8.	Draw all possible compartment models when the drug is given intravenously conferring two compartment model.	CO2
Q9.	Gentamycin has an average elimination half-life of 2 hrs and apparent volume of distribution is 20% of body weight. It is necessary to give gentamycin, 1.0 mg/kg every 8.0 hrs by multiple injection to a 50 kg woman with normal renal function. Calculate: (a) Cmax, (b) Cmin and (c) average steady state concentration.	CO3

PTO

Q10. A drug eliminated from the body by capacity-limited pharmacokinetics has a KM of 100 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 300 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. CO3

PART-III
Long Answers
(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

Q11. Discuss the pH-partition theory for the systemic absorption of weakly acidic and basic drugs. CO2

Q12. Discuss Wagner-Nelson Method in detail CO2

Q13. Derive an equation to estimate Xn(max) and Xn (min) when the drug is given intravenously at regular intervals. CO3

::::::27/04/2023::::::M