Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Course and semester: B.Pharm 6 sem
Name of the Subject: Biopharmaceutics and Pharmacokinetics
Subject Code: BP-604T
Time: 3 hour

Maximum Marks: 75

Note:
(i) This question paper contains three sections
(ii) All the sections are compulsory
(iii) All questions should cover COs of the course as per syllabus coverage.

Section-A

MULTIPLE CHOICE QUESTION **20 X 1 = 20 MARKS**

S.N	CONTENTS	
1.	Which of the following is the primary mechanism of drug absorption through the gastrointestinal tract (GIT)? A. Filtration B. Passive diffusion C. Phagocytosis D. Pinocytosis	CO-1
2.	Highly lipophilic drugs tend to accumulate in which type of tissue? A. Liver B. Bone C. Muscle D. Adipose tissue	
3.	Which of the following plasma proteins primarily binds acidic drugs? A. Albumin B. Alpha-1 acid glycoprotein C. Globulin D. Lipoprotein	
4.	Site 1 HSA drug binding is also known as A. Digitoxin binding site B. Warfarin & azopropazone binding site C. Diazepam binding site D. Tomaxifen binding site	
5.	Which of the following is correct decreasing order of drug metabolism A. Liver>lungs>kidneys >placenta>adrenals>intestines >skin B. Liver>lungs>kidneys >intestines >placenta>adrenals>skin C. Kidneys >intestines >liver >lungs>placenta D. Kidneys >intestines >lungs >liver >skin	CO-2
6.	The term bioavailability refers to the A. Relationship between the physical and chemical properties of a drug and the systemic absorption of the drug B. Measurement of the rate and amount of therapeutically active drug that reaches the systemic circulation C. Movement of drug into the body tissues over time D. Dissolution of a drug in the gastrointestinal tract	

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	A. Bioavailability B. Target concentration C. Volume of distribution D. Clearance	
17.	When plasma drug concentration increases more than expected after dose increase, the kinetics is: A. Nonlinear B. Linear C. Zero-order D. Steady state	CO-5
18.	Km is defined as: A. Drug concentration at half of Vmax B. The drug's maximum clearance C. Rate constant of metabolism D. Total drug in the body	
19.	In nonlinear kinetics, small dose increases can cause: A. Smaller increases in drug level B. Unpredictable drop in drug level C. Large, sometimes toxic, increases in plasma levels D. No change in kinetics	
20.	Which parameter in Michaelis-Menten affects the saturation point? A. Ka B. AUC C. Km D. Cl	

Section B

Short Questions: Attempt any seven questions. **7x5 = 35 marks**

SN	QUESTIONS	CO's
1.	Discuss the limitations and significance of PH partition hypothesis.	CO 1
2.	Explain the kinetics of protein binding of drugs.	CO 1
3.	Enlist various study designs used in bioequivalent studies. Discuss about latin square design.	CO2
4.	What is In-vitro–In-vivo Correlation (IVIVC)? Why is it important?	CO 2
5.	Define and explain the pharmacokinetic parameters: (a) Elimination rate constant (Ke), (b) Half-life (t½), (c) Volume of distribution (Vd), (d) Clearance (Cl), and (e) Area under the curve (AUC). Include their formulas and significance.	CO 3
6.	Discuss the one-compartment open model with IV bolus administration. Include a labeled diagram and the relevant equation.	CO 3
7.	What is multiple dosing? Explain the concept of drug accumulation and how steady state is achieved with repeated dosing.	CO 4
8.	Discuss the clinical importance of understanding pharmacokinetics in designing dosage regimens for drugs with narrow therapeutic index.	CO4

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7.	_____ is defined as the predictive mathematical model that describes the relationship between an in-vitro property of dosage form and in-vivo response. A. Pharmacodynamic Model B. In vitro– In vivo correlation C. Pharmacokinetic Model D. All of the above	
8.	Which of the following enzymes is not involved in catalysing a Phase I metabolic reaction? A. Flavin-containing monooxygenases B. Monoamine oxidases C. Glucuronyltransferase D. Esterases	
9.	Curve fitting method is used for the determination of- A. K_a B. K_E C. Cl_t D. AUC	CO-3
10.	Flip-flop phenomenon is observed, when absorption rate constant is determined by one of the following method- A. Loo-Reigleman method B. Method of residual C. Sigma minus method D. Wagner-Nelson method	
11.	First-order elimination means: A. Rate depends on drug concentration B. Rate is constant C. Drug is eliminated via zero order D. Drug follows nonlinear kinetics	
12.	At $t=\infty$, the concentration in IV infusion becomes: A. Zero B. Maximum C. Steady-state D. Equal to Ka	
13.	After IV bolus in a two-compartment model, the plasma concentration-time curve shows: A. Linear decrease B. Single exponential decline C. Biphasic decline D. Constant concentration	CO-4
14.	In the equation $C_c=Ae^{-\alpha t}+Be^{-\beta t}$, β represents: A. Elimination rate constant B. Distribution rate constant C. Absorption constant D. Clearance	
15.	Accumulation occurs in multiple dosing when: A. Dosing interval < half-life B. Dosing interval > half-life C. Dosing interval = half-life D. Dosing interval = clearance	
16.	Which parameter does not affect the loading dose?	

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9.	Explain the importance of Km and Vmax in the Michaelis-Menten model. How are these parameters estimated?	CO 5

Section C

Long questions: Attempt any two questions **2x10 = 20 marks**

SN	QUESTIONS	CO's
1	Enlist various factors influencing drug absorption through GIT. Explain in brief about physicochemical factors.	CO1
2	Describe the various methods aimed to enhancing bioavailability of poorly soluble drug.	CO2
3	Derive an expression for the determination of absorption rate constant by Wagner-Nelson method.	CO3