Name:

Enrolment No:

UPES
End Semester Examination, December 2024

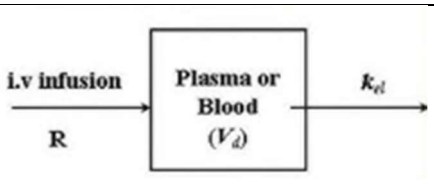
Course: Biopharmaceutics and Pharmacokinetics **Semester : V**
Program: Int. (B. Sc. + M. Sc. (Clinical Research) **Time : 03 Hours.**
Course Code: HSCR3014 **Max. Marks: 100**

Instructions: All questions in Sec A are compulsory.

Section A

Short answer questions/ MCQ/T&F
(20Qx1.5M= 30 Marks)

S. No.		30 Marks	CO
Q 1	State any three characteristics of active diffusion.	**1.5**	**CO1**
Q 2	Define absorption.	**1.5**	**CO1**
Q 3	_____ is not the mechanism of drug absorption. A. Active secretion B. Ion-pair transport C. Passive diffusion D. Endocytosis	**1.5**	**CO1**
Q 4	State the formula for calculating volume of distribution.	**1.5**	**CO1**
Q 5	Absorption of poorly soluble drugs is a_____ rate limited process. A. diffusion B. dissolution C. permeation D. perfusion	**1.5**	**CO1**
Q 6	Volume of distribution is less in the cases where the drug _____. A. binds to tissue proteins B. is lipophilic in nature. C. binds to plasma proteins D. has high tissue permeability	**1.5**	**CO1**
Q 7	_____ route of administration always shows 100% bioavailability. A. Oral B. Intramuscular C. Topical D. Intravenous	**1.5**	**CO2**
Q 8	If the drug is highly protein bound, the excretion of drug is expected to be decreased. A. True B. False	**1.5**	**CO2**
Q 9	Volatile drugs are excreted through_____. A. Kidney B. Liver C. Lung D. Spleen	**1.5**	**CO2**
Q 10	Define metabolism.	**1.5**	**CO2**
Q 11	_____ is used as an indicator for glomerular filtration. A. Creatinine B. Paracetamol C. Albumin D. Bilirubin	**1.5**	**CO2**
Q 12	$(C_{input} - C_{output}) / C_{input}$ is a representation for _____ of organ. A. Excretion B. Extraction ratio C. Absorption D. Blood flow	**1.5**	**CO3**

Q 13	In the given figure R stands for_____. A. IV bolus dose B. IV infusion time C. IV infusion rate D. Distribution of IV infusion 	**1.5**	**CO3**
Q 14	Generally, metabolism is _____ process. A. Zero order B. First order C. Second order D. Pseudo-first order	**1.5**	**CO3**
Q 15	In one compartment open model, "F" stands for _____. A. fraction excreted B. fraction metabolized C. dose administered D. fraction bioavailable	**1.5**	**CO3**
Q 16	Identify R_0 in the given figure. A. Dose of the drug B. Dose of infusion of drug C. Rate of infusion of drug D. Loading dose $\frac{dX}{dt} = R_0 - K_E X$	**1.5**	**CO3**
Q 17	If the drug has a high extraction ratio, it is expected that drug has low clearance. A. True B. False	**1.5**	**CO4**
Q 18	Draw a block diagram for one compartment open extravascular model.	**1.5**	**CO4**
Q 19	In_____pharmacokinetic parameters for a drug can change with change in dose. A. Linear B. Non-linear C. Bothe of the above D. None of the above	**1.5**	**CO5**
Q 20	Active processes are generally saturable at high doses of drug. A. True B. False	**1.5**	**CO5**
Section B (4Qx5M=20 Marks)			
Q	**Short Answer Type Question**	**20 Marks**	**CO**
Q 1	Explain two-compartment model.	**5**	**CO1**
Q 2	Summarize the use of bioavailability data.	**5**	**CO2**
Q 3	Differentiate active and passive diffusion.	**5**	**CO4**
Q 4	Illustrate and explain first order kinetics with the help of graph.	**5**	**CO3**
Section C (2Qx15M=30 Marks)			
Q	**Two case studies 15 marks each subsection**	**30 Marks**	**CO**
Q 1	A 70 kg patient is administered with a drug by IV infusion. The drug has plasma half-life of 11 hours, apparent Vd of 15.7 liters and desired steady state level plasma concentration of 0.0004 µg/mL. By assuming one compartment open model, calculate following parameters: a) Time required to reach 90% of Css **(3 marks)** b) Infusion rate to achieve Css **(4 marks)** c) Loading dose to achieve Css rapidly **(3 marks)** d) Concentration of drug in plasma after 48 hours **(3 marks)** e) Comment on the possible physico-chemical characteristics of the drug **(2 marks)**	**15**	**CO3**

Q 2	Explain IV bolus one compartment open model and deduce the pharmacokinetic factors used to explain it.	**15**	**CO4**
	Section D **(2Qx10M=20 Marks)**		
Q	**Long Answer type Questions**	**20 Marks**	**CO**
Q 1	Criticize any five factors affecting distribution of drug.	**10**	**CO4**
Q 2	a) Weakly acidic drugs are mostly absorbed from stomach. Justify the statement. b) Write down the formula for relative and absolute bioavailability.	**6+4**	**CO3**