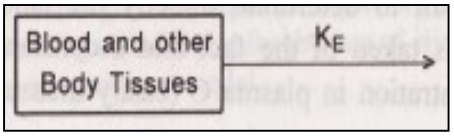
Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Course: Biopharmaceutics and Pharmacokinetics **Semester: VI**
Program: B. Pharm. **Time: 03 h.**
Course Code: BP 604 T **Max. Marks: 75**
Instructions: All the sections are compulsory.

SECTION A

S. No.	CO		Marks
		Answer all the questions.	**20**
1.	**CO1**	The transportation and alteration of the drug by the body is known as _____. A. Pharmacodynamics B. Pharmacokinetics C. Pharmacogenomics D. Toxicology	**1**
2.	**CO1**	Define facilitated diffusion.	**1**
3.	**CO1**	Following are the characteristics of passive diffusion of drug except. _____. A. It is an energy independent process. B. Drugs moves up the concentration gradient. C. It requires specific transporters. D. It is non saturable process.	**1**
4.	**CO1**	What kind of substance can easily cross the membrane? A. Lipid soluble drugs B. Ionized drugs C. Polar Drugs D. Hydrophilic drugs	**1**
5.	**CO1**	If the drug has volume of distribution 500 L, them comment on the characteristics of the drugs.	**1**
6.	**CO2**	State the formula for calculating the clearance.	**1**
7.	**CO2**	Which of the following route of administration always shows 100% bioavailability? A. Oral B. Intramuscular C. Topical D. Intravenous	**1**
8.	**CO2**	Which is the major site of drug metabolism in the body? A. Liver B. Skin C. Kidney D. small intestine	**1**
9.	**CO2**	If the clearance of the drug remains constant, doubling the dose rate will increase the steady-state plasma drug concentration by a factor of_____. A. 3 B. 2 C. 4 D. 5	**1**
10.	**CO2**	Plasma protein bound drug have low volume of distribution as compared to drugs that do not bind to plasma proteins. A. True B. False	**1**
11.	**CO3**	How much time is required to reach the 90% of steady state concentration in IV infusion? A. 2 half-lives B. 4 half-lives C. 6 half-lives D. 3.3 half-lives	**1**

12	**CO3**	The ratio of maximum safe concentration to minimum effective concentration is called as_____. A. Therapeutic range. B. Therapeutic outcome. C. Therapeutic index. D. Therapeutic ratio	**1**
13.	**CO3**	Method of residuals is used for the determination of ____ in pharmacokinetic data post-extravascular administration. A. Plasma drug concentration B. Renal excretion rate C. Rate constant for absorption (Ka) D. Clearance	**1**
14.	**CO3**	What is Mammillary model in pharmacokinetics?	**1**
15.	**CO3**	In one compartment open model, clearance can be calculated by_____. (Select all possible answers) A. $K_E V_d$ B. (dX/dt) / C C. Dose / AUC D. None of the above	**1**
16.	**CO3**	Identify the model depicted in given figure.  A. One compartment open model for IV bolus administration B. One compartment open model for IV infusion C. One compartment open model for IV extravascular administration One compartment open model for IV loading dose + IV infusion	**1**
17.	**CO4**	Draw a box model for "Two compartment open model for IV bolus".	**1**
18.	**CO4**	What is peripheral compartment in two-compartment model.	**1**
19.	**CO5**	Non-linear pharmacokinetics is also known as _____ . A. Dose dependent pharmacokinetics B. Enzyme capacity limited pharmacokinetics C. Saturation pharmacokinetics D. All of the above	**1**
20.	**CO5**	In non-linear kinetics, pharmacokinetic parameters change with the size of dose administered. A. True B. False	**1**
		SECTION B	
Answer any two questions of the following.			**20**
1.	**CO1**	a. What is volume of distribution and state the formula for calculating volume of distribution? b. Describe any three factors affecting volume of distribution.	**4+6**
2.	**CO3**	The equation best fits the pharmacokinetics of paracetamol after oral administration of 500 mg dose is $\mathbf{C = 1.18 (e^{-0.24t} - e^{-1.6t})}$. By assuming one compartment open model, calculate following parameters: a) Peak time (2 marks) b) Peak plasma drug concentration (3 marks) c) half-life of the drug (2 marks) a. Concentration of drug after 3 hours of administration (3 marks)	**10**
3.	**CO2**	A. How change in urine pH can be used to selectively excrete the drug via urine? B. Describe blood brain barrier in detail.	**6+ 4**
		SECTION C	

Answer any seven questions of the following.			**35**
1.	**CO5**	Non-linearity can be found in absorption and metabolism. Justify the statement.	**5**
2.	**CO2**	Explain any one non-renal excretion processes.	**5**
3.	**CO2**	Define bioavailability. And state the equations for calculating relative and absolute bioavailability.	**1+4**
4.	**CO3**	Describe once compartment open model for IV diffusion with the help of graph.	**5**
5.	**CO1**	Why weakly acidic drug is most likely absorbed from stomach.	**5**
6.	**CO4**	What are central and peripheral compartments in the two-compartment model? Give suitable examples.	**5**
7.	**CO5**	Derive the equation and graph for Lineweaver-Burk plot used for determination of Vmax and Km.	**5**
8.	**CO4**	Explain two-compartment open model IV infusion with the help of compartment diagram	**5**
9.	**CO3**	Enlist the application of compartment modeling in pharmacokinetics.	**5**
		Total	**75**