Seat No.:---------- *Enrolment No.:----------*

UKA TARSADIA UNIVERSITY

Maliba Pharmacy College

B. Pharm 6th Semester Internal Examination April 2014 (*Mid-Sem*)

030020601- Biopharmaceutics

Time: 10:30 a.m. To 12:30 p.m. Max. Marks: **40**

Date: 05/04/2014

Instructions:

- Attempt any **FIVE** questions.
- Each question carries **08** marks.
- Make suitable assumption whenever necessary.
- Figures to the right indicate full marks.

Q.1 A) State Fick's first law of diffusion and Explain passive diffusion in detail. 4

B) Explain pH partition hypothesis with limitations. 4

Q.2 A) Give Noyes-Whitney equation for drug dissolution and explain film theory of drug dissolution. 4

B) Enlist factors affecting protein binding of drug and explain displacement interaction with example. 4

Q.3 A) The equation that best fits the pharmacokinetics of Paracetamol after oral administration of 500 mg dose is: 4

$$C = 1.18 (e^{-0.24t} - e^{-1.6t})$$

Assuming one-compartment kinetics and calculate following parameters.

a. peak time

b. peak plasma concentration

c. elimination half-life of the drug

d. apparent V_d if fraction bioavailable is 0.4

B) 1. Define: (I) Loading dose (II) Sink condition 4

2. Name the three approaches by which a polar drug can be targeted to brain.

3. Define Dissolution no.

4. Define Dose no.

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Q.4 A) Define Pharmacokinetic Model and Explain Mammilary model and Caternary Model. 4

B) Define Non linear Pharmacokinetic and Explain Michaelis-Menten equation. 4

Q.5 A) The half-life of Propranolol in a 60 Kg patient is 4 hours and V_d is 5.5 liter/Kg.

a. Determine the total systemic clearance of the drug

b. What will be its renal clearance if fraction excreted unchanged in urine is 0.047?

c. If the drug is eliminated only by hepatic and renal routes, what will be the hepatic extraction ratio if blood flow to the liver is 1.5 liter/min?

d. If the blood flow rate to the liver reduces to 0.8 liter/min in situations of CCF, what will be the new hepatic and total systemic clearance values?

B) Give the comparison between plasma protein drug binding and tissue drug binding. 4

Q.6 A) 1. Describe different levels of IVIVC. 4

2. Write about BCS and their respective challenges in drug delivery.

B) The equation that best fits the plasma level time curve of Azlocillin after an I.V. bolus dose of 2000 mg (assuming one-compartment kinetics) is: 4

$$C = 143\ e^{-0.87t}$$

a. What is the apparent V_d and elimination half life of drug?

b. What will be the plasma drug concentration after 6 hours?

c. How much of the drug will be left in the body after 6 hours?

d. When should the next dose be administered if the drug becomes ineffective when the plasma level falls below 50 µg/ml?

Q.7 A) Discuss different problems in developing PK/PD relationship. 4

B) Write short note on following: 4

1. IP dissolution apparatus –II
2. Objectives of dissolution profile comparison