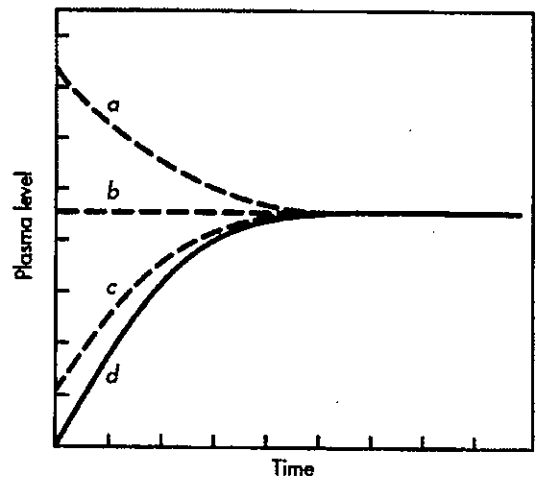
1. There are four plasma drug concentration-time curves shown in the figure. Curve *d* represents the plasma drug concentration-time curve following intravenous infusion at a constant infusion rate *R* until a steady-state concentration is reached. (每小題 5 分，共 20 分)

(1) Write down the concentration-time equation for curve *d*. All symbols need to be defined clearly.

(2) Explain under what circumstance curve *b* will be achieved.

(3) Write down the concentration-time equation for curve *b*. All symbols need to be defined clearly.

(4) Explain under what circumstance curve *a* will be achieved. What should you concern in this case?



2. You are assigned to conduct a bioequivalence study of a generic drug product and a brand name product. A randomized two-way crossover design with a proper washout period between two treatments is performed. The subjects are randomly assigned to receive a single dose of each product orally. The blood and urine samples are collected at specific time points. Please answer the following questions as clear as possible. (每小題 5 分，共 15 分)

(1) How do you decide the total sampling time period for blood samples and what is your rationale?

(2) How do you decide the total sampling time period for urine samples and what is your rationale?

(3) What are the pharmacokinetic parameters for bioequivalence assessment if plasma samples are collected?

3. If the disposition of a drug after intravenous bolus administration of 200 mg dose follows one compartment pharmacokinetics, where the plasma drug concentration can be described by $C_P = 10\ e^{-0.0693t}$. C_P (μg/mL) is the plasma drug concentration, and t (hour) represents the time. (每小題 5 分，共 15 分)

(1) Calculate the half-life of the drug.

(2) Calculate the volume of distribution.

(3) Calculate the total area under the plasma drug concentration-time curve.

見背面

4. 舉例說明 membrane transporters 在 ADME 上的角色。 (16 分)

5. 說明 fu 對藥物在體內代謝、分佈及排泄的影響。 (9 分)

6. 解釋何為 PBPK 及 population pharmacokinetics，及其於臨床或藥物開發上的應用 (10 分)

7. The followings are the values of total body clearance of drug-A and drug-B:

Drug A: 1300 ml/min

Drug B: 26 ml/min

Both drugs are mainly metabolized by CYP2C19. Which drug is likely to show the greatest decrease in hepatic clearance in a patient who is a CYP2C19 poor metabolizer? (必須解釋原因) (5 points)

8. Based on the following pharmacokinetic data for drug A, B, and C:

(a) Which drug takes the longest time to reach steady state? (必須解釋原因) (5 points)

(b) Which drug would achieve the highest steady-state drug concentrations? (必須解釋原因) (5 points)

	Drug A	Drug B	Drug C
Rate of infusion (mg/hr)	10	20	15
K (hr^{-1})	0.5	0.1	0.05
CL (L/hr)	5	20	5

試題隨卷繳回