一、Phenytoin was administered to a patient at dosing rates of 150 and 300 mg/day, respectively. The steady-state plasma drug concentrations were 8.6 and 25.1 mg/L, respectively. What dose is needed to achieve a steady-state concentration of 11.3 mg/L?（必須列解題過程）（10 分）

二、Phenytoin is an anticonvulsant agent with low extraction ratio. Please describe how genetic polymorphism may influence the pharmacokinetic properties of phenytoin and clinical outcome of epileptic treatment.（10 分）

三、In-vitro assay has shown that the herbal extract, potent-T, can significantly inhibit the metabolism of various drugs that are substrates of CYP2C9 and/or CYP3A4. However, the in-vivo pharmacokinetic study did not show any significant difference in the plasma levels of these drugs when potent-T is concomitantly used. Please describe the potential reasons for the discrepancy between in-vivo and in-vitro drug interaction data of potent-T.（10 分）

四、Based on the following time-concentration data of Drug-A, estimate the MRT of drug-A.（15 分）（必須列解題過程）

Time (hr)	Concentration (ng/mL)		
0	0		
0.167	0.06		
0.333	3.6		
0.5	7.8		
1	13.3		
1.5	14.5		
2	16.9		
3	16.6		
4	11.9		
6	6.3		
8	3.5		
10	1.4		
12	0.6		

五、Based on the following pharmacokinetic data for drugs A, B, and C, which drug takes the longest time to reach steady-state.（5 分）（必須詳述原因）

	Drug A	Drug B	Drug C
IV infusion rate (mg/hr)	10	20	15
Vd (L)	10	200	100
CL (L/hr)	5	20	5

見背面

六、A new drug is administered by continuously intravenous infusion for urgent hypertension. The standard infusion rate is 100 ug/min. The equation,

$C= 10 (1-e^{-0.116t})$, gives the plasma drug concentration (C, mg/L) at any time (t, hr) during the intravenous infusion. Please answer the following questions.

a. What is the value of the steady-state drug concentration in the plasma? （5 分）
b. When the plasma drug concentration would reach 90% of steady-state drug concentration in the plasma? （5 分）
c. What is the loading dose of this drug to target the initial plasma drug concentration at 15 mg/L? （5 分）
d. If the patient's blood pressure is still high after 48 hr infusion. The goal of steady-state drug concentration in the plasma is readjusted to 15 mg/L. What is the infusion rate that you suggest to reach the goal? （5 分）

七、Two oral medications, A and B, are 100% metabolized by liver enzymes. Both of them are anti-hypertensive drugs with low hepatic extracting ratio and high hepatic extracting ratio, respectively. Please indicate and explain the influences of the following factors on their bioavailability, respectively.

a. Increased enzyme activity（5 分）
b. Inhibition of metabolism（5 分）
c. Decrease blood flow（5 分）
d. Increase fraction unbound in blood (fu) （5 分）

八、Ms. Wang was patient under hemodialysis due to end-stage renal failure since five years ago. She received a single intravenous bolus injection (2 g) of an antibiotic because of celullulitis. During the next 48 hr, the elimination half-life of the antibiotic was 24 hr. The patient was then under 4-hr hemodialysis and the elimination half-life of the drug was reduced to 6 hr.

a. How much the antibiotic was removed from the body during the 48 hr before the hemodialysis? （5 分）
b. How much the drug was left in the body by the end of the dialysis period? （5 分）

試題隨卷繳回