※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

1. 收集尿液檢品，分析定量尿液中的藥品排除量，並於半對數紙上作圖(x-軸為時間)，請回答下列問題：
(所有參數及符號須清楚標註其名稱)

(1) 以 Sigma-Minus method 作圖時的 y 軸、斜率和截距。(5 分)

(2) 以 Excretion Rate Method 作圖時的 y 軸、斜率和截距。(5 分)

2. 根據 Apparent Volume of Distribution (V_D，擬似分佈體積)，請回答下列問題：

(1) V_D 的定義及代表的意義。(5 分)

(2) 寫出 V_D 與蛋白結合之關係式子 (所有參數及符號須清楚標註其名稱)。(5 分)

(3) 延續(2)，寫出上述關係式子之推導步驟。(5 分)

3. 根據 Biopharmaceutics Classification System (BCS)，請回答下列問題：

(1) 寫出藥品的四大分類。(8 分)

(2) 對各類藥品的體內吸收分別提出改善方法。(8 分)

4. 根據生體相等性(Bioequivalence, BE)試驗，請回答下列問題：

(1) 若採用人體血液及尿液檢品，寫出最常被用於評估的藥動參數各 2 個。(4 分)

(2) 一般被用於評估生體相等性的 2 種統計方法及判定原則。(5 分)

見背面

5. Phenytoin is an anticonvulsant agent with low extraction ratio and nonlinear pharmacokinetic properties. Phenytoin is mainly metabolized by CYP2C9 and partly by CYP2C19. Phenytoin is also known to be a substrate of P-glycoprotein. Following an oral administration, please describe how genetic polymorphism may influence the pharmacokinetic properties (in terms of clearance, AUC, and brain distribution) of phenytoin and clinical outcome of epileptic treatment.
(**20 points**; 5 points each)

6. 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 is the dose needed to achieve a steady-state concentration of 11.3 mg/L? **(必須列解題過程)** (**10 points**)

7. Why does a drug that has a high extraction ratio (e.g., propranolol) demonstrate greater differences between individuals after oral administration than after intravenous administration? (**5 points**)

8. The risk of myopathy during treatment with HMG-CoA reductase inhibitors is increased with concurrent therapy with erythromycin, cyclosporine, or fibrate. Pravastatin (F = 0.17) is HMG-CoA reductase inhibitor and is a substrate of OATP1B1. Explain the impacts of the changes in the OATP1B1 activity on the therapeutic efficacy and myopathy of pravastatin, respectively. (**5 points**)

9. The AUC and AUMC values of drug-A following an I.V. bolus of 5 mg are 278 μg-hr/L and 1390 μg-hr^2/L, respectively. The plasma concentration profile of this drug can be described by one-compartment model. Calculate the volume of distribution at steady-state (Vdss) of this drug (**10 points**)

試題隨卷繳回