

**PHA5127 – Dose Optimization I
Homework 1
Fall 2013**

Note: make sure to show units in your work

Question 1

Drug X was administered to a patient via IV bolus administration at a dose of 400 mg. The plasma concentration-time profile is presented in the table below:

Time (h)	Conc ($\mu\text{g/mL}$)
0	67.8
1	52.8
3	32.02
6	15.13
12	3.38

- (1) Plot the concentration versus time in both linear and semi-log scales and determine the order of the elimination process **(1.5 points)**

- (2) Determine the elimination rate constant and the half-life of the drug **(1 point)**

- (3) Determine the clearance and volume of distribution **(1 point)**

- (4) Calculate $\text{AUC}_{0-\text{last}}$ and $\text{AUC}_{0-\text{infinity}}$ (use the trapezoidal rule) **(1 point)**

- (5) Determine the drug concentration at 14 hour **(0.5 point)**

Question 2

Explain how highly perfused organs differ in drug distribution to fat tissue and bone. **(2 points)**

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True/False (3 points)

- (1) For a first-order elimination process, the change in drug concentration with respect to time is a constant and is independent of the remaining drug in the system.

- (2) Therapeutic drug monitoring is only required for drugs with slow clearance.

- (3) The serum is the supernatant portion of the whole blood that is collected in heparin tube and then centrifuged.