Case Study 1
PHA 5127 – Fall 2006

Question 1. A 3 year old, 15 kg patient was brought in for surgery and was given a 100 mcg/kg iv bolus injection of a muscle relaxant. The plasma concentrations were measured post injection and noted in the table below:

Time (h)	Plasma Conc. (mcg/L)
0.5	100
1	85
3	57
5	37
7	22

Determine the following pharmacokinetic parameters of the drug for this patient:

a) The elimination rate constant (k_e).
b) The half life ($t_{1/2}$).
c) The initial plasma drug concentration (C_o).
d) The volume of distribution (V_d).
e) The area under the curve ($AUC_{0\rightarrow\infty}$) using the trapezoidal rule.
f) At 2 hours after injection, what is the plasma drug concentration?

Question 2. Following are the physicochemical properties of three drugs:

Property	Drug A	Drug B	Drug C
Molecular Weight	315	378	90,000
pKa	Neutral	Base	-
Polarity of unionized form	Non-polar	Polar	Protein

The muscle would most likely take up which of the above mentioned drugs? Why? What type of distribution (perfusion or permeability) limits the other drugs?

Question 3. Which of the following statements best describes a zero-order or first-order process:

a) The same fraction of drug is eliminated during a given time interval.
b) The same amount of drug is eliminated during a given time interval.
c) The time vs. plasma drug concentration profile is as follows: