Name: ____________________

OR

UFID #: ______________________

PHA 5127

First Exam

Fall 2004

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

Name

Put all answers on the bubble sheet. If you need to comment or question a problem please note this on the front page.

TOTAL _______/160 pts
Question Set I (True or False) (25 points)

True (A) or False (B). On the bubble sheet mark A for true or B for false

For a high extraction drug

1: T F Hepatic clearance will be larger than that of a low extraction drug
2: T F Hepatic clearance will depend on liver blood flow
3: T F Hepatic clearance will depend on plasma protein binding
4: T F Oral bioavailability will be low
5: T F Hepatic clearance will be determined by the GFR
Question Set II
(15 points)

Compare the following two concentration time profiles after a single bolus injection. The two lines differ in only one of the subsequent parameters. Please identify which parameter is different.

6: The 2 lines differ in:

<table>
<thead>
<tr>
<th>Parameter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Dose</td>
</tr>
<tr>
<td>B.</td>
<td>Vd</td>
</tr>
<tr>
<td>C.</td>
<td>Clearance</td>
</tr>
</tbody>
</table>
Question Set III (Matching)  
(20 points)

For the physiological changes listed below, select the induced changes on the pharmacokinetic parameters for a lipophilic, unionizable (no acid or basic group in the molecule), protein bound high extraction drug that is also eliminated by renal elimination (only filtration, no reabsorption).

Select the effect on kinetics
(A) $C_l_{\text{REN}} \downarrow$  (B) $C_l_{\text{HEP}} \uparrow$ (C) oral bioavailability $\downarrow$ (D) $V_D \uparrow$  (E) none of the listed answers

Physiological change
7: Increase in metabolic enzymes____
8: Decrease in plasma protein binding ____
9: Increase in liver blood flow____
10: Decrease in creatinine clearance____
Question Set IV (Matching)  
(20 points)

(Assume GFR is 130 mL min\(^{-1}\), urine flow is 1.5 ml min\(^{-1}\)) For the following situations, indicate whether the drug is:

Select from the following choices:

- (A) only filtered
- (B) filtered and reabsorbed through passive diffusion
- (C) filtered and actively secreted
- (D) filtered and reabsorbed through transporters

11: A drug with \(f_u = 0.04\) and \(\text{Cl}_{\text{REN}} = 40\) mL min\(^{-1}\) is ___.

12: A drug with \(f_u = 0.20\) and \(\text{Cl}_{\text{REN}} = 26\) mL min\(^{-1}\) is ___.

13: A drug with \(f_u = 0.30\) and \(\text{Cl}_{\text{REN}} = 0.45\) mL min\(^{-1}\) is ___.

14: A drug with \(f_u = 1.0\) and \(\text{Cl}_{\text{REN}} = 0.15\) mL min\(^{-1}\) is ___.


**Question Set V**

(20 points)

A drug is eliminated through glomerular filtration (no other clearance mechanisms is observed). **It does not bind to plasma proteins.** Glomerular filtration rate is normal (130 ml/min). No active renal secretion and passive or active reabsorption after renal filtration is observed. The volume of distribution is **50 L.**

15: What is the clearance? (10 points)

A: 1.3 L/h  
B: 2.2 L/h  
C: 7.8 L/h  
D: 80 L/h

16: What is the $k_e$ of the drug? (10 points)

A: 0.044 h$^{-1}$  
B: 0.0260 h$^{-1}$  
C: 0.1560 h$^{-1}$  
D: 1.600 h$^{-1}$  
E: 0.390 h$^{-1}$
Question Set VI  
(10 points)

17: The nurses gave an iv bolus injection of an unknown drug at 7 a.m. They also did not record the dose. One hour after injection (8 a.m.) the concentration was found to be 6mg/L of plasma. Assume a $k_e$ of 0.150 h$^{-1}$.

What would be the concentration at 8 pm?

A  1.15 mg/L  
B  0.8 mg/L  
C  1.0 mg/L  
D  0.1 mg/L  
E  0.2 mg/L
Question Set VII

The same dose of triazolam was given either alone or with rifampin. Explain what is going on. (5 points)

Please choose the correct answers.
1: The clearance of triazolam is decreased in the presence of rifampin.
2: Triazolam is likely to be a high extraction drug.
3: Rifampin is an enzyme inducer.
4: Rifampin increases the volume of distribution of Triazolam.

18. Select the correct answer

A: 1
B: 1, 2
C: 3
D: 2, 3
E: 4
Question Set VIII (True or False)
(25 points)

True (A) or False (B). On the bubble sheet mark A for true or B for false

For a lipophilic unionized drug (no acid, or base)

19: T  F  The renal clearance will depend on the tissue binding of the drug.

21: T  F  The renal clearance will depend on plasma protein binding.

22: T  F  Drinking a lot of water will increase the renal clearance.

23: T  F  Involvement of renal transporters in the renal elimination of the drug is likely.

24: T  F  The renal clearance will be smaller than the GFR.
Question Set IX (True or False)

(20 points)

True (A) or False (B). On the bubble sheet mark A for true or B for false

25: T  F  The tissue uptake of a lipophilic unionized drug is more likely to be perfusion controlled.

26: T  F  The degree of plasma protein binding affects the metabolic clearance of all drugs that are metabolized in the liver.

27: T  F  Increase in plasma protein binding will decrease the volume of distribution of a lipophilic drug.

28: T  F  The renal clearance of a highly ionized drug is more likely to be affected by drug/drug interactions.