1. For the following situations, indicate whether the drug is filtered, reabsorbed or actively secreted (Assume GFR is 130 mL min$^{-1}$, urine flow is 1.5 ml min$^{-1}$)

- A drug with $fu = 0.02$ and a $Cl_{REN} = 20$ mL min$^{-1}$ is _______________________
  
  (GFR*fu=2.6 < Clren, Secreted)

- A drug with $fu = 0.40$ and a $Cl_{REN} = 52$ mL min$^{-1}$ is _______________________
  
  (GFR*fu=52 = Clren, Filtered)

- A drug with $fu = 0.30$ and a $Cl_{REN} = 0.45$ mL min$^{-1}$ is _______________________
  
  (GFR*fu=39 > Clren= Urine flow*fu=1.5*.3, Complete Reabsorbed)

2. Calculate the $ke$ of a 56 year old, 79 kg male patient with a serum creatinine of 1.6 mg/dL who requires an aminoglycoside treatment. [Use $ke= 0.00293 \ (CrCL)+0.014 \ hr^{-1}$].

   Solution:

   with Cockcroft-Gault Equation

   $ClCr = \frac{(140 - \text{age}) \cdot \text{Wt} \cdot (\text{SerumCr})}{(72 \cdot 1.6)} = \frac{(140 - 56) \cdot 79}{(72 \cdot 1.6)} = \frac{57.6}{min}$

   $ke = 0.00293 \ (CrCL) + 0.014 \ h^{-1} = 0.183 \ h^{-1}$

3. Mark whether the following statements for a **high extraction drug** are True or False

   \[ Cl = \frac{Q_H \cdot f_u \cdot Cl_{int}}{Q_H + f_u \cdot Cl_{int}} \approx Q_H \]

   \[ E = \frac{f_u \cdot Cl_{int}}{Q_H + f_u \cdot Cl_{int}} \approx 1 \]

   \[ F = 1 - E \approx \frac{Q_H}{f_u \cdot Cl_{int}} \]

   T  F  The oral bioavailability (F) will be close to 1. (F)

   T  F  Clearance will increase significantly after induction of the relevant enzyme. (F)

   T  F  The hepatocyte membranes do not represent a barrier. (T)

4. Mark whether the following statements are True or False

   T  F  a. Since creatinine is endogenous and predominantly eliminated by kidney, its clearance is a good estimation of renal active secretion. (F)

   T  F  b. Creatine clearance can only be used to estimate the renal clearance of drugs that are similar to creatine, which does not show plasma albumin binding. (F)
c. “Linear pharmacokinetics” means that the plasma drug concentration versus time plots will result in a straight line. (F)