1. Drug X follows a one-compartment model after an IV bolus administration. The half-life of drug X is 0.693 hour, the volume distribution is 150 L and \( f_u \) is 0.5. There are multiple routes for the elimination of drug X. We know that filtration is the only factor involved in renal elimination (no re-absorption or secretion). Assume GFR is 130mL/min.
   a. Calculate the elimination rate constant \( k_e \)
   b. Calculate the total clearance
   c. Calculate the renal clearance and the renal elimination rate constant \( k_{\text{eren}} \)
   d. Calculate the non-renal clearance
   e. Besides renal elimination, is it possible that hepatic elimination is the only other route of elimination? Why?

2. Drug Y follows a one-compartment model after an IV bolus administration. 66 mg is given to a 70kg male patient by IV bolus. The concentrations at 0.5 and 3 hours are 0.236 \( \mu \)g/mL and 0.042 \( \mu \)g/mL, respectively.
   a. Calculate the elimination rate constant \( k_e \)
   b. Calculate \( C_0 \)
   c. Calculate \( V_d \)
   d. Calculate the total clearance
   e. Calculate \( \text{AUC}_{0-\infty} \)
   f. If the drug is given twice daily (8 a.m. and 8 p.m.)), the concentration at noon of day 30 is 0.021 \( \mu \)g/mL. What will be the concentration right before the second dose of that day (8 p.m.)?

3. How will the following parameters change (increase ↑, decrease ↓, no change ↔) for a low extraction drug which also undergoes renal elimination if \( f_u \) change from 0.2 to 0.8?
   a. \( V_d \)
   b. \( E_H \) (hepatic extraction ratio)
   c. \( F \) (oral bioavailability)
   d. \( CL_H \) (hepatic clearance)
   e. \( CL_{\text{eren}} \)
   f. \( CL_{\text{tot}} \)
   g. \( \text{AUC}_{0-\infty} \)

**Note: PLEASE circle your final answer for each question.**