1. A 45 year old male patient weighing 80 kg with a subtherapeutic theophylline concentration of 3 mg/L is admitted to the hospital for treatment. Based on average pharmacokinetic parameters (\( V_d = 0.5 \text{ L/kg, } t_{1/2} = 8 \text{ hr} \)), calculate an i.v. bolus loading dose and a maintenance dose (i.v. infusion) to increase the concentration to 13 mg/L.

2. The plasma concentration one hour after an i.v dose of gentamycin was 7.9 mg/L. After 6 hours, the concentration was 3.2 mg/L. What would be the concentration 10 hours after the dose?

3. A 55 year old man weighing 80 kg is given a 750 mg theophylline dose by i.v. bolus injection every 6 hours. Assume that the volume of distribution is 0.5 L/kg and that the \( t_{1/2} = 7.5 \text{ hr} \). Predict the steady state peak and trough concentrations.

4. Calculate the extraction ratio of phenylbutazone in a 70 kg patient, given the following information: liver blood flow, 1500 mL/min; half-life, 50 h; \( V_d \), 0.1 L/kg; no non-hepatic elimination.

5. Lidocaine has a total body clearance of 9.2 ml/kg/minute. What zero-order infusion rate would be needed to induce a steady-state concentration of 10 \( \mu \text{g/ml} \)?