Please provide all answers with their appropriate units. 0.5 points will be deducted for each missing or inappropriate unit. Please show how you found your answers. If you do not show your work and your answer differs from the right solution, no points will be given. This homework is due Feb. 21st.

Question 1

A.Z. a 42-year old, 62.5 kg female will receive carbamazepine tablets. Please calculate a daily oral dose to achieve average steady plasma concentration of 6 mg/L for monotherapy (1 pt)
B.Z. is a 58-year old, 67 kg male and will take valproic acid tablets. In a previous trial of a single dose of 500 mg in this patient, it was found that an initial concentration of 48 μg/ml had been reduced to 14 μg/ml within 24hr. Suggest a dosing regimen for her treatment to maintain concentration within range from 50 to 100 mg/L. (2 pts)
Question 3

A patient (35-year old, 68 kg) is to be started on phenobarbital sodium. (3 pts)

a. Calculate a loading dose to yield plasma concentration of 20 mg/L

b. Calculate a daily maintenance dose to produce an average steady state concentration of 20 mg/L.

c. The same patient is to be treated simultaneously with carbamazepine. Propose an oral maintenance dosing regimen for carbamazepine for this patient to achieve a carbamazepine level of 6 μg/mL.
Question 4

50-year old, 68 kg male has been receiving 200mg/day (100 mg BID) of phenobarbital (S=1) for the past 25 days. Please calculate the phenobarbital plasma concentration just before the morning dose on Day 26. (2 pts)
Question 5

A recent study was performed to investigate the effects of ketoconazole and carbamazepine on the pharmacokinetics of Drug X. Drug X was given to the subjects alone, or co-administration of ketoconazole or carbamazepine. The plasma concentration of Drug X is presented in the following Figures. Which of the following statement is FALSE? And WHY? (2 pts)

**Figures: Drug X concentration-time profiles**

A) In this study, ketoconazole increased mean Drug X plasma Cmax significantly; and Carbamazepine decreased mean Drug X plasma Cmax dramatically.

B) Cytochrome P450 3A4 is a primary enzyme responsible for the metabolic clearance of Drug X.

C) Ketoconazole is the strong inhibitor of CYP3A4, and carbamazepine is the strong inducer of CYP 3A4.

D) Other drugs and ingested natural products that strongly modulate the activity or expression of CYP3A4 would be predicted to change exposure to Drug X.

E) Clearance of Drug X is increased by ketoconazole; and decreased by carbamazepine.