The following questions MAY HAVE MORE than one answer. You may choose from A, B, C, or D below. Please read carefully. (Each question is worth 2 points)

1. Which of the following graphs below represents an EXTRAVASCULAR DOSE?  
   - A or C

2. Which of the following graphs below represents an INTRAVENOUS DOSE?  
   - B

3. Which of the following graphs below represents a TWO-COMPARTMENT MODEL?  
   - C

4. What equation is used to describe the plasma concentration-time curve in GRAPH B?  
   \[ C_p = C_0 e^{-kt} \]

5. In GRAPH A above, what is the \( C_{\text{max}} \) and \( T_{\text{max}} \)?  
   \[ C_{\text{max}} = 10 \text{ mg/mL}, \ T_{\text{max}} = 1 \text{ hr} \]

6. In GRAPH B above, what is the initial concentration, \( C_0 \)?  
   \[ C_0 = 10 \text{ mg/L} \]

D. None

For the following answers, you will need to use the above graphs and give YOUR BEST ESTIMATE. (Each question is worth 2.5 points)
SHORT ANSWERS – Answer ANY TWO of the following questions #7, #8, or #9. Please be as thorough as possible with your answers and provide examples (visually) if necessary. (4 points each)

7. Define enterohepatic cycling and describe how this process can alter plasma concentration-time curve profiles.

Enterohepatic cycling is the pathway of a drug which is distributed from the blood to the liver, into the bile, which is stored in the gall bladder until it is secreted into the duodenum for reabsorption into the systemic circulation again.

8. Describe how the first-pass effect can alter plasma concentration time curves of drugs.

If a drug undergoes extensive metabolism in the liver and gut/enteric, then less of the parent drug will reach the systemic circulation. This is resulting in decreased AUC and low Cmax. (See graph Drug A). If a drug is fully absorbed and does not get metabolized (not by the enzymes in the liver or gut) then the bioavailability is high, high Cmax and longer AUC. The most important enzyme in the gut is CYP3A4, which can be inhibited by grapefruit juice. This inhibition can result in drug AUC’s and Cmax.

9. How can a dosage form alter the bioavailability of a drug?

Many factors such as IV vs. oral.

1. V = F*10 D, where F can vary with oral and/or other metabolized by CYP3A.

extravascular dosage forms. Oral dosage forms: bioavailability can vary depending on solvents used (disperges), salt form, crystalline vs. amorphous form. Increased bioavailability is seen with salts and increased supersaturation (multiple use), the onset time and Cmax can vary with immediate versus sustained release products.

TRUE or FALSE for questions 10 - 13 below (1 point each).

10. The half-life (t1/2) changes with increasing dose for drugs that display non-linear pharmacokinetics.

False

11. The half-life (t1/2) remains constant for zero-order pharmacokinetics.

True

12. The half-life (t1/2) remains the same with increasing dose for drugs that display first-order pharmacokinetics.

True

13. Drugs with a low volume of distribution (Vd), < 5 L, indicate that the drug is predominately located in the vascular compartment.

True