編號： 296

國立成功大學 108 學年度碩士班招生考試試題

系　　所：臨床藥學與藥物科技研究所

考試科目：藥劑學

考試日期：0224，節次：1

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Describe four possible chemical reactions for drug degradation. For each mechanism, give one drug example and explain the approaches to improve its stability. (12%)

2. Describe five sterilization methods for sterile preparations and compare their advantages and disadvantages. (15%)

3. Pharmacokinetics of a drug follows one compartment model in the body with elimination half-life of 2 hour, volume of distribution of 10 L/60 kg, and therapeutic window of 0.4-0.6 μg/mL. A pharmaceutical company intended to develop the drug's transdermal patch system. Three formulations were designed with *in vitro* characteristics as follows:

Formulation	A	B	C
Release rate (μg/h/cm^2)	120	80	160
Skin penetration rate (μg/h/cm^2)	40	60	80

If protein binding is not concerned,

(1) What would be the approximate target skin penetration rate of the transdermal patch? (4%)

(2) Which formulation presents the best controlled-release effect, and why? (4%)

(3) Which would be the optimal formulation if a patch size within 5×5 cm^2 is desired? (4%)

4. Explain the formulation strategies that may be employed for oral delivery of BCS class II drugs. (11%)

5. Describe the mechanism of competitive, noncompetitive and uncompetitive enzyme inhibition. (12%)

6. Describe the effects of drug metabolic enzymes and transporters on the four classes of BDDCS (Biopharmaceutics Drug Disposition Classification System) drugs. (16%)

7. What are the main pharmacokinetic parameters that influence (1) time for peak drug concentration and (2) peak drug concentration? (10%)

8. The plasma concentration (Cp, mg/L)-time (t, hr) profile of a drug following a single intravenous bolus of 600 mg is best described by the equation $Cp = 75e^{-0.231t}$.
Estimate (1) the elimination half-life, (2) the volume of distribution and (3) the plasma drug concentration after 6 hr. (12%)