編號： 311

國立成功大學 106 學年度碩士班招生考試試題

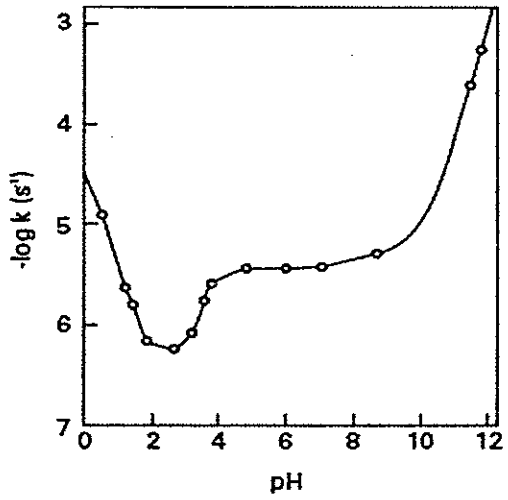
系　　所：臨床藥學與藥物科技研究所

考試科目：藥劑學

考試日期：0214，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. A pharmacist is preparing a physically, chemically stable aspirin suspension (Aspirin's pKa=3.49) for an 80 year-old female. Please discuss the following:
   (1) The relationship between pH and aspirin solubility (5%)
   (2) The pH and stability profile of aspirin (5%)
   (3) Suggest a flocculating agent and the reason (5%)



2. To prepare an emulsion containing the following oil mixture:

		Required HLB
Shea butter	40%	8
Jojoba butter	30%	6.5
Sunflower seed oil	30%	7

   (1) What is the required HLB of the oil mixture? (5%)
   (2) If Span 80 (HLB = 4) and Tween 80 (HLB = 15) are chosen as emulsifier, what will be their ratio? (5%)

3. Ointment is one of the major topical formulations to be applied onto the skin to directly treat cutaneous disorders, or the cutaneous manifestations of general diseases.
   (1) What parameters may influence the release of the active ingredient from the ointment? Write down the governing equation and explain the meanings of each denotation. (5%)
   (2) What parameters may influence the skin penetration rate of the active ingredient from the ointment? Write down the governing equation and explain the meanings of each denotation. (5%)

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4. To prepare 30 capsules of the following prescription using lactose as diluent:

Rx:		tapped density
Diphenhydramine HCL	25 mg	800 mg/ml
Phenyltoloxamine citrate	30 mg	750 mg/ml
Acetaminophen	325 mg	850 mg/ml
Lactose	q.s.	950 mg/ml

If size 0, 1, 2 and 3 capsules are available, and their volume capacity as follows:

0: 0.67 ml

1: 0.5 ml

2: 0.37 ml

3: 0.3 ml

(1) What is the smallest size of capsule that can be used for the prescription? (5%)

(2) Determine the total amount of lactose required for that size of capsule. (5%)

5. What is the minimum amount of a potent drug that may be weighted on a prescription balance with a sensitivity requirement of 1 mg if at least 98% accuracy is required? (5%)

6. A drug exhibiting one-compartment disposition kinetics has an elimination half-life of 8 hours and a volume of distribution of 500 mL/kg in patients. If a single 600-mg dose is given to a patient (weight 60 kg) by rapid IV injection:

(1) What percent of the dose is eliminated (lost) in 24 hours? (5%)

(2) What is the expected plasma drug concentration at 24 hours post-dose? (5%)

7. A drug that follows one-compartment kinetics was found to be eliminated from the plasma by the following pathways with the corresponding elimination rate constants.

Metabolism: $km = 0.030\ h^{-1}$;

Kidney excretion: $ke = 0.025\ h^{-1}$;

Biliary excretion: $kb = 0.015\ h^{-1}$

(1) What is the elimination half-life of this drug? (5%)

(2) What would be the half-life of this drug if biliary secretion was completely blocked? (5%)

(3) If drug-metabolizing enzymes were induced so that the rate of metabolism of this drug doubled, what would be the new clearance assuming that the volume of distribution was 10 L? (5%)

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8. What are the main pharmacokinetic parameters that influence time to peak drug concentration and peak drug concentration? (10%)

9. What are the conditions that may affect drug dissolution and release tests? (15%)