



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

PPA 320: PHARMACEUTICS II

DATE: Wednesday 28th March, 2012

TIME: 11.00 a.m. – 1.00 p.m.

INSTRUCTIONS

- Answer all questions
- Each section must be answered in a separate answer booklet.

SECTION A

1. Differentiate between spray drying and spray congealing of pharmaceuticals (4marks)
2. State three methods used in both size analysis and particle separation (3 Marks)
3. Describe the operating principle of a fluidized-bed drier (4 marks)
4. In solid-liquid separation (filtration) (4 marks)
 - a. Why is a filter aid used
 - b. Give two examples of filter aids used in pharmaceutical separation.
5. Describe the separation principle in sedimentation method (3 marks)
6. Define the following terms (4 marks)
 - a. Water activity
 - b. Critical moisture content
7. Differentiate between the scale and intensity of segregation as a measure of degree of mixing (4 marks)
8. Name four non-thermal methods of drying (4 marks)
9. Define scale of scrutiny as used in powder mixing (2 marks)

10. Calculate the particle size of both the active pharmaceutical principle (API), and starch (excipient) required to manufacture Dexamethasone tablets given that 50mg of tablet contains 50µg Dexamethasone. The monograph specification requires 95.5 % of tablets to contain between 47.5 µg and 52.5 µg of API. Assume the particles are spherical and their mean particle density is 1.5gcm^{-3} (8 marks)

SECTION B

1. Use ONE rheogram to demonstrate the different types of flow of fluids (4 marks)
2. Explain how manipulation of parameters in Stoke's equation can be used to improve the physical stability of suspensions (6 marks)
3. A pharmaceutical solution with a density of 1.25 g/ml attains a shear rate of 150 s^{-1} when shear stress of 0.18 Nm^{-2} is applied. Calculate its;
 - a. Dynamic viscosity in centipoises
 - b. Kinematic viscosity in centistokes ($\text{N}=\text{kgms}^{-2}$) (6 marks)
4. a) What is the scientific basis for performing accelerated stability testing of pharmaceutical products? (2 marks)
b) The data obtained during a stability study for a pharmaceutical solution, carried out 40°C , is shown below;

Time in months	Drug concentration
0	125 mg/ml
6	85 mg/ml

Calculate the shelf life for the product at 20°C , given the following;

- The drug decomposition follows first order kinetics
- The activation energy for the reaction is 24 KJmol^{-1}
- $R = 8.314\text{ JK}^{-1}\text{mol}^{-1}$ (10 marks)

5. Differentiate between coordination complexes and molecular complexes (2 marks)
6. Describe FIVE ways in which cyclodextrin inclusion complexes are used to improve drug delivery. (10 marks)

SECTION C

1. Sketch the phase diagram for a two liquid mixture with an upper consolute point. How would knowing the value of the consolute point be of significance in drug formulation? (3 marks)
2. Describe the working principle of the capillary rise viscometer (4 marks)
3. Explain the significance of contact angle in the formulation of suspensions (3 marks)
4. Given that the surface tension of water is 72.8 mNm^{-1} , that of olive oil is 36 mNm^{-1} , and the interfacial tension between the two liquids is 36 mNm^{-1} , determine whether;
- a. a small amount of olive oil will spread on water
 - b. a small amount of water will spread on olive oil (6 marks)
5. Classify surfactants by chemical nature, and for each class provide an example and its application. (12 marks)
6. Briefly discuss factors that influence stability of lyophobic colloidal systems according to the Deryagin, Landau, Verwey and Overbeek (DLVO) theory (12 marks)