



KENYATTA UNIVERSITY

SUPPLEMENTARY/SPECIAL EXAMINATION 2020/2021

EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

PPA 320: PHARMACEUTICS II

August–September 2021

TIME: 3 Hours

INSTRUCTIONS:

ANSWER ALL QUESTIONS.

SECTION A (40 MARKS)

1. Outline the solid-solid and liquid-liquid mixing mechanisms. (3 Marks)
2. Explain the necessity of monitoring a mixing process? (3 Marks)
3. Describe the lacey mixing index. (3 Marks)
4. Explain the process of ordered mixing. (3 Marks)
5. Describe the approaches to minimize vortex formation in a propeller mixer. (4 Marks)
6. Describe **four** types of powder segregation. (4 Marks)
7. Outline **four** applications of solid/liquid filtration in pharmaceutical processing. (4 Marks)
8. Describe **four** mechanisms of filtration. (4 Marks)
9. Explain the process of convective static drying of wet solids. (4 Marks)
10. Outline **four** properties of a product that has undergone freeze drying. (4 Marks)
11. Discuss **four** advantages of fluidized bed drying? (4 Marks)

SECTION B (40 MARKS)

1. Explain the difference between Couette and Searle types of viscometers. (4 Marks)
2. Outline the advantages of the Cone and plate viscometer over the Cup and bob viscometer. (4 Marks)
3. Describe the phenomenon of plug flow in rheology. (4 Marks)

4. Describe the following profiles of Newtonian and Non-Newtonian behaviour as a function of shear rate.
- Flow profile. (4 Marks)
 - Viscosity profile. (4 Marks)
5. A sample of a gel was analyzed in a modified Stormer viscometer. A driving weight, w , of 450 g produced a bob velocity, v , of 350 rpm. A series of velocities was obtained using other driving weights, and the data were plotted. The yield value intercept, w_f , was obtained by extrapolating the curve to the shearing stress axis where $v = 0$, and the value of w_f was found to be 225 g. The instrumental constant, K_v , is 52.0, and K_f is 20.0. Calculate:
- The yield value of the sample. (4 Marks)
 - The plastic viscosity. (4 Marks)
6. A new ointment base was designed and subjected to rheologic analysis at 20°C in a cone-plate viscometer with an instrumental constant, C , of 6.277 cm^{-3} . At a cone velocity of $v=125\text{ rpm}$ the torque reading, T , was 1287.0 dyne cm. The torque, T_f , at the shearing stress axis was found to be 63.5 dyne cm. $C_f = 113.6\text{ cm}^{-3}$ for a medium-size cone (radius of 2.007 cm) Calculate the following:
- The plastic viscosity of the ointment base. (4 Marks)
 - The yield value of the ointment base. (4 Marks)
7. An Ostwald viscometer was used to measure acetone which was found to have a viscosity of 0.313cp at 25°C . Its density at 25°C is 0.788 g/cm³. What is the kinematic viscosity of acetone at 25°C ? (4 Marks)

SECTION C (40 MARKS)

- Classify surface active agents (surfactants) on the basis of their polar head groups. (4 Marks)
- Describe the basis of assigning HLB (Hydrophilic-Lipophilic Balance) numbers to surfactants? (4 Marks)
- Differentiate between surface tension and interfacial tension. (4 Marks)

4. Using equations, explain the spherical shape of a droplet of water or similar liquids. (6 Marks)
5. Compare the working principles of capillary to Du nouy methods of measuring surface tension in liquids. (4 Marks)
6.
 - i) Describe the DLVO theory. (3 Marks)
 - ii) Discuss the effects of salt concentrations on the DLVO diagram. (3 Marks)
7. Describe the classification of colloids. (6 Marks)
8. Describe the derivation of Langmuir adsorption isotherm. (6 Marks)