



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FIRST BPHARM PART II EXAMINATION – JUNE/JULY 2023

PH 1242 PHARMACEUTICS IB -SEQ PAPER

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions in **part A, B, C and D** of this SEQ paper.
- Answer **all** questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.

PART A

1.

1.1.

1.1.1. Explain the viscosity of following non-Newtonian fluids with the aid of shear stress graphs. Give an example fluid for each case.

1.1.1.1. Dilatant (10 marks)

1.1.1.2. Pseudoplastic (10 marks)

1.1.1.3. Rheopectic (10 marks)

1.1.1.4. Thixotropic (10 marks)

1.1.2. A metal plate with an area of $5 \times 10^{-4} \text{ m}^2$ is placed on a $6 \times 10^{-4} \text{ m}$ thick layer of castor oil. If a force of 2.5 N is needed to move the plate with a velocity $2 \times 10^{-2} \text{ ms}^{-1}$, calculate the viscosity coefficient of castor oil. (15 marks)

1.2.

1.2.1. Radiopharmaceuticals are unlike conventional pharmaceuticals. Justify the statement. (10 marks)

1.2.2. Define the physical half- life of a radioisotope. (15 marks)

1.3. Briefly explain the following radioactive decay processes.

1.3.1. Beta (β^-) decay (10 marks)

1.3.2. Positron (β^+) decay (10 marks)

PART B

2.

2.1. Write three examples from natural environment to confirm the involvement of surface energy to the stability of a system. Give reason(s) for your answers. (12 marks)

2.2. Capillary action is a phenomenon associated with surface tension. Give a short account on capillary action. (10 marks)

2.3. Calculate the work done against the surface tension forces in blowing a soap bubble with 1cm diameter. The surface tension of soap solution is $2.5 \times 10^{-2} \text{ N/m}$. (17 marks)

- 2.4. What is critical micelle concentration? (05 marks)
2.5. Give one application of micelles in Pharmacy and briefly explain the nature of the micelle's structure which gives the action. (06 marks)

PART C

- 2.6. What are amphiphilic colloids? (10 marks)
2.7. List three pharmaceutical applications of colloids. (15 marks)
2.8. Describe the process of dispersion in the preparation of colloids. (25 marks)
3.
3.1.
3.1.1. State two differences between simple distillation and steam distillation. (10 marks)
3.1.2. Draw and label the apparatus setup used for the steam distillation process. (25 marks)
3.1.3. Briefly describe the process of separating two immiscible liquids using steam distillation. (30 marks)
- 3.2.
3.2.1. Define elutriation. (15 marks)
3.2.2. Differentiate between trituration and levigation techniques. (20 marks)

PART D

4.
4.1. Write three desirable qualities of a pharmaceutical suspension. (15 marks)
4.2. Differentiate between flocculated suspension and de-flocculated suspension. (20 marks)
4.3. Write two identification tests usually perform to determine the type of an emulsion. (10 marks)
4.4. Briefly explain the following instabilities seen in an emulsion.
4.4.1. Flocculation (10 marks)
4.4.2. Coalescence (10 marks)
4.5. Drug "A" has the initial concentration of $5.0 \times 10^{-3} \text{ g cm}^{-3}$ in an aqueous solution. After 24 months, the concentration of Drug 'A' dropped to $3.48 \times 10^{-3} \text{ g cm}^{-3}$. This degradation process is known to follow first-order kinetics.
4.5.1. Determine the rate constant for this reaction. (15 marks)
4.5.2. Determine the half -life of the drug "A". (10 marks)
4.5.3. Determine the shelf-life of the drug "A". (10 marks)

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