UNIVERSITY OF JAFFNA, SRI LANKA
FACULTY OF ALLIED HEALTH SCIENCES
THIRD YEAR SECOND SEMESTER EXAMINATION IN BPharmHons-2023
PHAPA 3244 PHARMACEUTICAL ANALYSIS

Date: 23. 05.2025 **Time: 3 Hours**

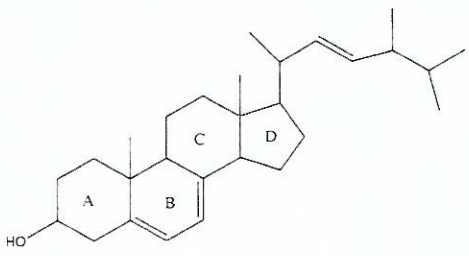
ANSWER ALL THE SIX QUESTIONS

1. 1.1 Define crystallization. **(10 Marks)**
   1.2 State the principle of crystallization. **(20 Marks)**
   1.3 List the factors that affects crystallization. **(20 Marks)**
   1.4 Briefly explain how the crystallization techniques are used to purify the samples. **(50 Marks)**

2. 2.1 Give the principle of gravity column chromatography **(20 Marks)**
   2.2 List the factors that affect the column efficiency and explain it. **(30 Marks)**
   2.3 Aspirin is synthesised from salicylic acid with excess of acetic anhydride in presence of strong acid. Explain how the gravity column chromatographic technique could be used to purify the aspirin from the impurities. **(50 Marks)**

3. 3.1 State the principle of size exclusion chromatography. **(10 Marks)**
   3.2 A sample contains three compounds with different molecular weights: A (MW 30,000), B (MW 10,000), and C (MW 90,000).
   3.2.1 Briefly explain how you purify the samples using size exclusion chromatography. **(30 Marks)**
   3.2.2 Indicate the elution order of these compounds with justification. **(20 Marks)**
   3.3 Write a short account on ion exchange chromatography. **(40 Marks)**

4. 4.1 What is blue and red shift? **(20 Marks)**
   4.2 State the theory of Ultraviolet-Visible Spectroscopy. **(20 Marks)**
   4.3 Write an account on the instrumentation of Ultraviolet-Visible Spectroscopy. **(40 Marks)**
   4.4 Calculate λ_{max} of following compound.



(20 Marks)

5. 5.1 Write short note on the followings:

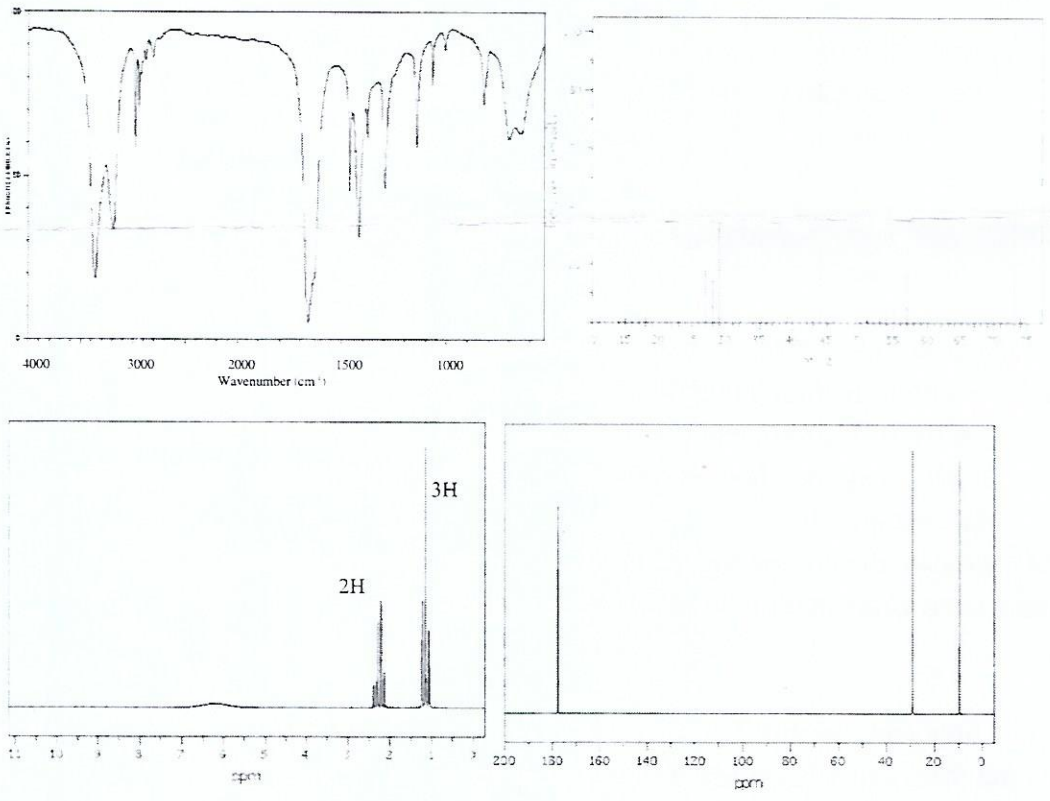
5.1.1 Turbidimetry **(20 Marks)**

5.1.2 Hydrophobic-Interaction Chromatography **(20 Marks)**

5.2 5.2.1 Define Chemical Shift. **(10 Marks)**

5.2.2 Chemical shift values of the compounds are as follow: CH_2Cl_2 (δ 5.3), CH_3F (δ 4.3), CH_3Cl (δ 3.0), CH_3I (δ 2.1). Explain the reasons for this order. **(50 Marks)**

6. A Compound has a molecular formula of C_3H_7NO.The structure of the compound is analysed with IR, ^{1}H-NMR, ^{13}C-NMR and Mass spectroscopy. The analysed data of the spectra are given below.



6.1 Determine the degree of unsaturation of the compound and predict the possible functional group/s. **(20 Marks)**

6.2 Assign the spectra of IR, ^{1}H-NMR, ^{13}C-NMR and Mass. **(70 Marks)**

6.3 Deduce the structure of the compound. **(10 Marks)**