

Series N° 3

Exercise 01

A mixture containing three organic compounds **A**, **B**, and **C** is analyzed using **TLC** on a **silica gel plate**. The mobile phase used is **hexane/ethyl acetate (7:3)**.

After development, the solvent front moved **8.0 cm** from the baseline. The distances traveled by the compounds are:

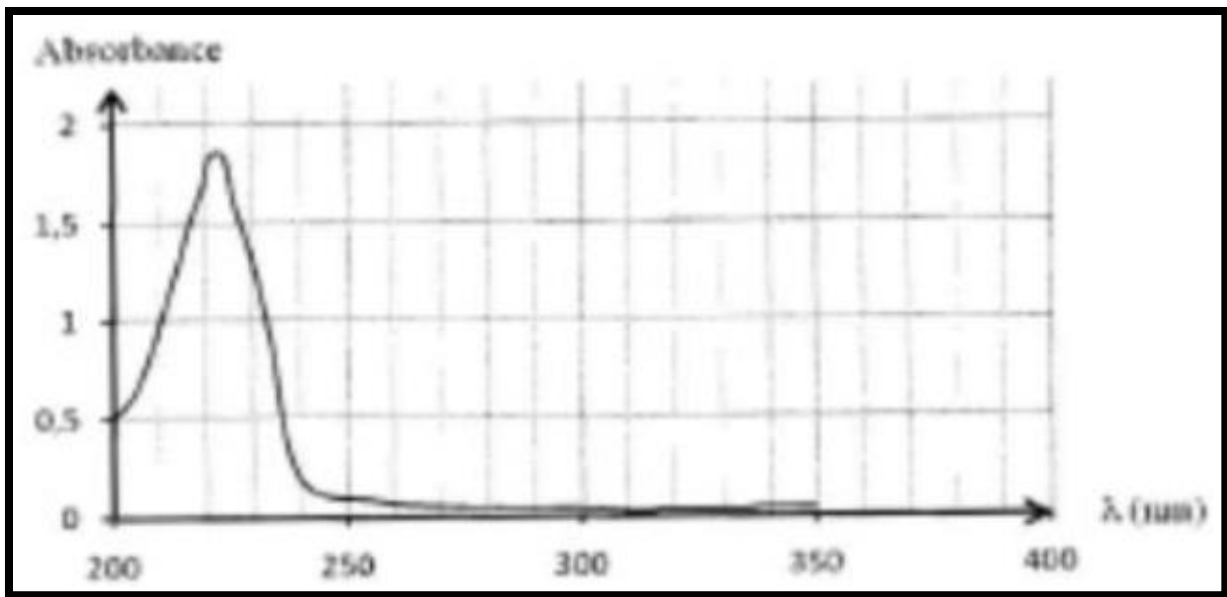
Compound	Distance traveled (cm)
A	2.0
B	4.8
C	6.4

Questions

1. Calculate the **Rf value** for each compound.
2. Which compound is **the most polar**? Explain your answer based on the stationary phase.
3. Which compound has **the strongest interaction with the stationary phase**
4. If compound **B** is the desired product and compound **A** is an impurity, explain how TLC can be used to **monitor the progress of a reaction**.
5. If the mobile phase polarity is increased (for example **hexane/ethyl acetate 5:5**), what will happen to the **Rf values**?

Exercise 02

The ultraviolet spectrum of **2-methylbuta-1,3-diene** is recorded.



1. What is the value of the **wavelength of the maximum absorption**?
2. What is the value of the **absorbance at the maximum absorption**?
3. To obtain this spectrum, the molecule is dissolved in **methanol**. The thickness of the spectroscopic cell is standard: $l = 1.0 \text{ cm}$, and the **molar absorption coefficient** has a value of $10800 \text{ L}\cdot\text{mol}^{-1}\cdot\text{cm}^{-1}$.
 - a) What condition must the **solvent** satisfy in order to be used in **UV-Vis spectroscopy**?
 - b) Calculate the **molar concentration of the solution** used.

Exercise 03

