

Oluwafemi



OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE, NIGERIA
B.Sc. (CHEMISTRY) DEGREE EXAMINATION
2023/2024 Harmattan Semester Examination

CHM 301: INSTRUMENTATION AND ANALYTICAL CHEMISTRY I

TIME ALLOWED: 2 Hours

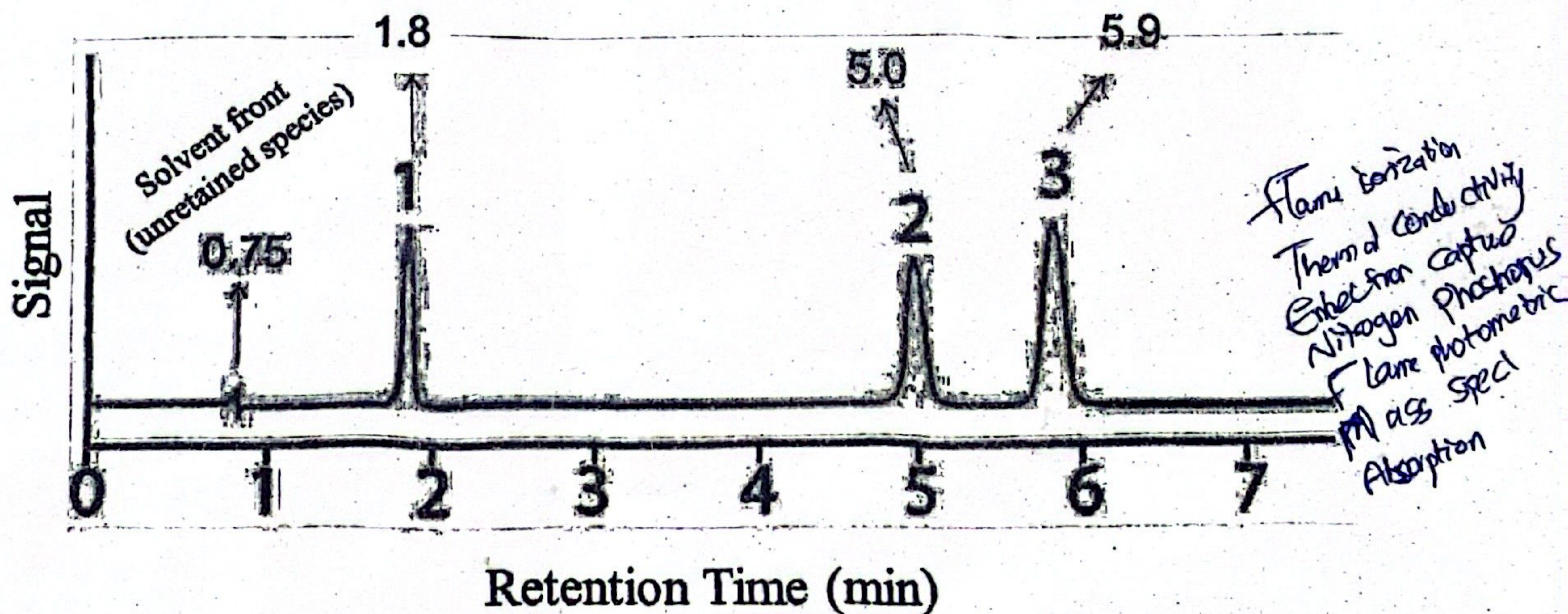
DATE: Tuesday, 18/02/2025

INSTRUCTIONS: Attempt ALL the questions. Each question carries 24 marks

- 1(a) Explain the following: (i) Spectroscopy, (ii) Spectrophotometry, (iii) Spectrophotometer.
(b) State three important postulates of quantum theory that can be used to explain interactions of radiation and matter.
(c) List and explain any three ways by which excitation can be achieved in an atom.
(d) Describe the three emission spectra you know (a suitable diagram is essential).
(e) Using a well labelled diagram, explain the functions of the major components of Atomic Absorption Spectrophotometer (AAS).
(f) (i) Differentiate between *automatic* instruments and *automated* instruments.
(ii) Using a suitable diagram, briefly explain how a pH-Stat functions. [24 marks]

- 2 (a) Calculate the retention factor (k'_A) for peaks 1, 2 and 3 in the chromatogram shown below:
(b) Comment on the quality of those peaks for quantitation [12 marks].

molecules and ions are in discrete state



- 3 (a) List the basic components of a Gas Chromatography and most common types of detectors used in Gas Chromatography.
(b) State the characteristics of a good detector [12 marks].
- 4 (a) In not more than **five lines**, explain how an unknown concentration of an analyte, such as SO_4^{2-} , can be determined using absorption instruments.
(b) State **five limitations** of Beer-Lambert law.
(c) Briefly discuss the similarities and differences between turbidimetry and nephelometry.
(d) Why do some absorbing compounds fluoresce and others do not?
(e) State **five applications** of fluorimetry [24 marks].