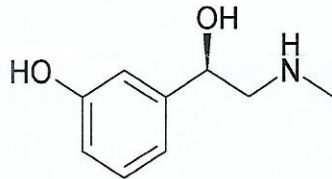


UNIVERSITY OF JAFFNA, SRILANKA
BACHELOR OF PHARMACY
FOURTH YEAR FIRST SEMESTER EXAMINATION – OCTOBER 2019
PHAPA 4114 PHARMACEUTICAL ANALYSIS

DATE: 29.10.2019

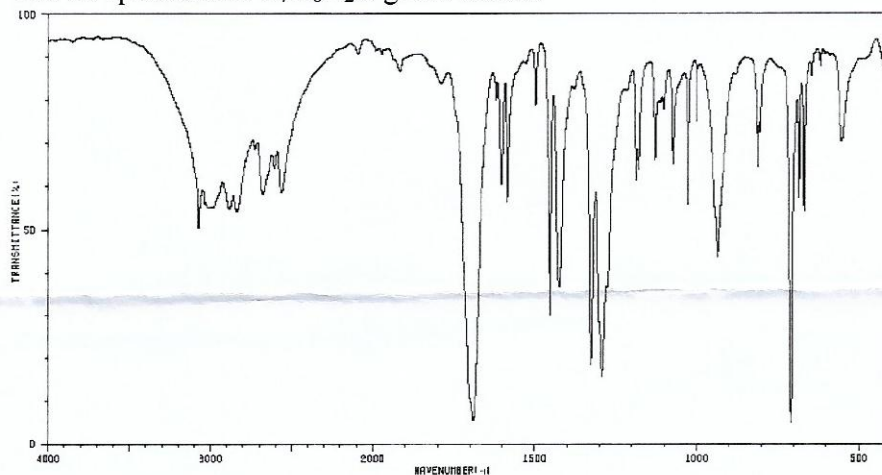
TIME: 2 Hours.

- 1
 - 1.1 Explain how molecules are separated in ion exchange chromatography. (25 Marks)
 - 1.2 Describe the mode of split and split less injection systems in gas chromatography. (25 Marks)
 - 1.3 Draw the schematic diagram and describe the following detectors used in gas chromatography.
 - 1.3.1 Flame ionization detector. (25 Marks)
 - 1.3.2 Nitrogen phosphorus detector. (25 Marks)
- 2
 - 2.1 Explain why H^a proton of BrCH₂CH^aBr₂ is rising a triplet in ¹H Nuclear Magnetic Resonance (NMR) spectrum. (25 Marks)
 - 2.2 Explain how chemical shift is affected by electron density around a nucleus. (25 Marks)
 - 2.3 Draw and describe the ¹H NMR spectrum of the following molecule.



(50 Marks)

- 3
 - 3.1 List five (5) applications of Infrared (IR) spectroscopy. (20 Marks)
 - 3.2 Explain why C-H bonds absorb higher frequency of IR radiation. (15 Marks)
 - 3.3 The IR spectrum of C₇H₈O₂ is given below.

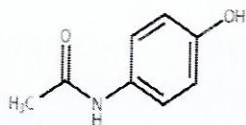


Identify and describe five (5) peaks that are consistent with the molecular formula.

(35 Marks)

3.4 Predict the positions of IR peaks of following compounds.

3.4.1



(15 Marks)

3.4.2 $\text{HC}\equiv\text{CCIC}=\text{CHCH}_2\text{COOH}$

(15 Marks)

- 4 4.1 Give the principle of atomic absorption spectroscopy. (20 Marks)
- 4.2 Explain the interferences in atomic emission spectroscopy. (25 Marks)
- 4.3 Describe the instrumentation of Ultraviolet-visible (UV) spectroscopy with the help of schematic diagram. (55 Marks)
- 5 5.1 Give the basic principle of mass spectrometry. (20 Marks)
- 5.2 Draw the schematic diagram and describe the following ionisation techniques used in mass spectrometry.
- 5.2.1 Electron ionisation. (25 Marks)
- 5.2.2 Atmospheric pressure chemical ionisation. (25 Marks)
- 5.3 Draw the schematic diagram and describe the Quadrupole Mass Filter (QMF) used in Matrix Assisted Laser Desorption Ionisation Mass Spectrometry (MALDI-MS). (30 Marks)
- 6 6.1 Define the terms "Quality Assurance" and "Quality Control". (20 Marks)
- 6.2 Briefly describe the function of Quality assurance section of a pharmaceutical company. (50 Marks)
- 6.3 Describe the powdered glass test for glass containers. (30 Marks)