

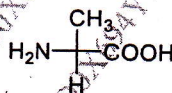
Time : 3 Hours

Marks : 75

20

Q1 Multiple choice questions

1. The type of electronic transitions permissible in the ultraviolet region are:
 - a. Π to Π^*
 - b. σ to σ^*
 - c. σ to n^*
 - d. Π to σ^*
2. One of the methods of quantitative analysis of a binary mixture, where both components absorb at each others' λ_{max} is _____.
 - a. By using specific absorbance of the two components.
 - b. By simultaneous equation method.
 - c. By double point assay method
 - d. By calibration graph method
3. The given molecule can be quantitatively analysed by fluorescence spectroscopy by using _____.
 - a. $SOCl_2$
 - b. DANSYL chloride
 - c. Differential spectroscopy.
 - d. Suitable pH conditions.



4. The IR frequency which can help to distinguish between Acetone and Acetic acid is _____.
 - a. 1650 cm^{-1} for the $\text{C}=\text{O}$ group.
 - b. 3000 cm^{-1} for the C-H stretch frequency.
 - c. 3300 cm^{-1} for the O-H stretch
 - d. 1600 cm^{-1} for the C-C stretch
5. _____ can be used as a detector in an Infrared spectrophotometer.
 - a. Photodiode array detector
 - b. Flame ionization detector
 - c. Pyroelectric detector
 - d. Dynode
6. The molecular emission spectrum appears _____ absorption spectrum of the molecule.
 - a. To the left of
 - b. To the right of
 - c. Above
 - d. Below
7. The signal for methylene protons in the ^1H NMR spectrum of ethyl bromide will be a
 - a. Quartet
 - b. Singlet
 - c. Triplet
 - d. Doublet

8. The δ scale of chemical shift values in C13 NMR spectrum ranges from
 - a. 0 to 10
 - b. 0 to 100
 - c. 0 to 200
 - d. 0 to 1000
9. Cinnamic acid derivatives are used in which ionization technique in mass spectrometry
 - a. Electron impact
 - b. Chemical Ionization
 - c. Field desorption
 - d. MALDI
10. In mass spectrometry, the most intense peak is called the
 - a. Molecular ion peak
 - b. Isotope ion peak
 - c. Base peak
 - d. Fragment ion peak
11. A mixture of compounds P, Q, R and S was separated on a Silica gel TLC plate. If their polarity order is $P > Q > R > S$, _____ will have highest R_f value.
 - a. P
 - b. Q
 - c. R
 - d. S
12. Which of the following techniques is an example of planar chromatography?
 - a. HPLC
 - b. HPTLC
 - c. GC
 - d. Gel Chromatography
13. Isocratic elution in HPLC involves _____
 - a. Changing the mobile phase composition with time
 - b. Successive injection of the sample
 - c. Changing the length of the column
 - d. Using constant mobile phase composition throughout the run time
14. _____ chromatographic parameter is used in quantification of an analyte.
 - a. Peak area
 - b. Capacity factor
 - c. Retention time
 - d. Tailing factor
15. Head space analysis is an application techniques associated with....
 - a. Ion exchange chromatography
 - b. HPLC
 - c. Gas Chromatography
 - d. Gel Chromatography
16. In Gas Chromatography sometimes the samples need to be derivatized in order to increase their _____.
 - a. Volatility
 - b. Solubility
 - c. Conductivity
 - d. Polarizability

Pharmacology

F.Y. M. Pha
07/04/25

Sem I

17. In Affinity chromatography separation is based on _____
 - a. Molecular weight of the analytes
 - b. Specific interaction between analyte and ligand
 - c. Solubility of analyte
 - d. Polarity of the analyte
18. With reference to column chromatography, amongst the following _____ is an indication of the presence of an asymmetric peak
 - a. Capacity Factor
 - b. Tailing factor
 - c. Resolution
 - d. Selectivity factor
19. _____ chromatography is called as size exclusion chromatography
 - a. Ion exchange
 - b. Gel
 - c. Affinity
 - d. Ion pair
20. Isoelectric point of protein fractions in the biological sample is important for separation in
 - a. Gel chromatography
 - b. Ion pair chromatography
 - c. Ion exchange chromatography
 - d. Paper chromatography

QII Attempt any two out of three: 20

- 1a State and derive the Beer- Lambert's law. What are its limitations?
- 1b With the help of a Jablonski's diagram, explain the electronic transitions responsible for molecular emission.
- 2a Two compounds X and Y were analyzed by RP-HPLC using a column of length 25 cm. The retention times of X and Y were found to be 6.4 min & 7.2 min respectively. The peak width measured at the base were 1.1 min and 1.2 min respectively. Based on the above data, answer the following
 - Calculate the resolution between compounds X and Y.
 - Calculate number of theoretical plates for compound X & Y
 - Justify whether this value of resolution can be accepted or not.
 - Compare the polarity of X and Y and justify your answer
- 2b Discuss the types of molecular vibrations responsible for absorption of IR radiation. Enlist the factors affecting molecular bond vibration frequency.
- 3a Suggest three fragmentation pathways for n-propyl benzene
- 3b Predict the number of signals, their approximate δ values and splitting pattern in the proton NMR spectrum of ethyl methyl ketone

QIII Attempt any seven out of nine

35

- 1 Enlist the methods useful for quantitative analysis of a single component based on uv spectroscopy. Discuss any one method in detail.
- 2 With the help of a diagram, discuss the instrumentation of an FTIR instrument.
- 3 What is quenching of fluorescence? With the help of suitable examples, classify quenching.
- 4 Give three points of differences between proton NMR and C13 NMR spectroscopy. What is an FID signal? Enlist ways of simplifying a complex NMR spectrum.
- 5 Enlist Ion sources in mass spectrometry. Discuss any one in detail.
- 6 Write a note on Van Deemter equation
- 7 Illustrate a typical chromatogram depicting dead time, retention time and adjusted retention time. Give four points of difference between GC and HPLC.
- 8 Enlist steps involved in HPTLC. Discuss different techniques for visualization of spots in thin layer chromatography
- 9 Enlist different detectors used in Gas Chromatography. Explain any one detector in detail
