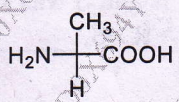
F.Y.M. Pharm
07/04/25
Sem - I

Time :3 Hours **Marks : 75**

QI Multiple choice questions 20

1. The type of electronic transitions permissible in the ultraviolet region are: 1
   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' λmax is _____. 1
   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 _____. 1



   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 _____. 1
   a. 1650 cm^{-1} for the C=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. 1
   a. Photodiode array detector
   b. Flame ionization detector
   c. Pyroelectric detector
   d. Dynode
6. The molecular emission spectrum appears _____ absorption spectrum of the molecule. 1
   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 1
   a. Quartet
   b. Singlet
   c. Triplet
   d. Doublet

8. The δ scale of chemical shift values in C13 NMR spectrum ranges from 1
   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 1
   a. Electron impact
   b. Chemical Ionization
   c. Field desorption
   d. MALDI
10. In mass spectrometry, the most intense peak is called the 1
    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 1
    a. P
    b. Q
    c. R
    d. S
12. Which of the following techniques is an example of planar chromatography? 1
    a. HPLC
    b. HPTLC
    c. GC
    d. Gel Chromatography
13. Isocratic elution in HPLC involves_____ 1
    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. 1
    a. Peak area
    b. Capacity factor
    c. Retention time
    d. Tailing factor
15. Head space analysis is an application techniques associated with…. 1
    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____ 1
    a. Volatility
    b. Solubilty
    c. Conductivity
    d. Polarizability

Pharmaceutics Quality Assurance

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17. In Affinity chromatography separation is based on _____ 1
    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 _____ 1
    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 1
    a. Ion exchange
    b. Gel
    c. Affinity
    d. Ion pair
20. Isoelectric point of protein fractions in the biological sample is important for 1
    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

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