Final year B. Pharm Sem – VII

24/11/2025

Time: 3 hours **Max. Marks: 75**

Note:

1. **Draw neat labeled diagrams wherever applicable**

Q I. Multiple choice questions **20M**

1. What is the effect of increasing conjugation on the wavelength maxima?
   a) Blue shift b) Red shift
   c) No change d) Decrease in intensity

2. A photomultiplier tube differs from a phototube because it contains:
   a) Only one anode b) Semiconductor materials
   c) No electrodes d) Multiple dynodes for signal amplification

3. In UV spectrophotometric multi-component analysis by Simultaneous Equations method, absorbance values are measured at
   a) Wavelength Maxima of one compound
   b) Wavelength Maxima of both the compounds
   c) Isobestic point
   d) Wavelength Maxima of one compound and isobestic point

4. The process of conversion from singlet excited state to triplet state is called:
   a) Intersystem crossing b) Internal conversion
   c) Quenching d) Relaxation

5. Which of the following electronic transitions requires the least energy?
   a) $\sigma \rightarrow \sigma^*$ b) $n \rightarrow \sigma^*$
   c) $n \rightarrow \pi^*$ d) $\pi \rightarrow \pi^*$

6. What is the full form of FTIR Spectroscopy?
   a) Fast Transmission Infrared Spectroscopy
   b) Fourier Transform Infrared Spectroscopy
   c) Frequency Tuned Infrared Spectroscopy
   d) Functional Test Infrared Spectroscopy

7. What is the relation between wavenumber of IR absorption and bond strength:
   a) Wavenumber is directly proportional to square root of the bond strength
   b) Wavenumber is directly proportional to the square of bond strength
   c) Wavenumber is inversely proportional to the bond strength
   d) Wavenumber is independent of the bond strength

8. Flame photometry is a type of____
   a) Atomic emission spectroscopy b) Molecular emission spectroscopy
   c) Atomic absorption spectroscopy d) Molecular absorption spectroscopy

9. In atomic absorption spectroscopic techniques, absorption of radiation takes place by the sample which is in the_____
   a) Solid state b) Gaseous state
   c) Liquid state d) Supercritical fluid state

10. Decrease in the intensity of light which is not scattered is measured in _____technique
    a) Colourimetry
    b) Fluorimetry
    c) Nephelometry
    d) Turbidimetry

11. In adsorption chromatography, separation is based on:
    a) Partition of solute between two immiscible liquids
    b) Molecular size
    c) Ion exchange between solute and stationary phase
    d) Differential adsorption of solute molecules on a solid surface

12. If compound X travels 3 cm from the line of application and the solvent front travels 6 cm from the line of application, the Rf value for X is:
    a) 2
    b) 0.5
    c) 0.3
    d) 1.2

13. In capillary electrophoresis, electro osmotic flow (EOF) helps to:
    a) Move species with positive and negative charges towards detector
    b) Move species with negative charge towards detector
    c) Prevent migration
    d) Move species with positive charge towards detector

14. Head Space analysis is Gas chromatography is the term associated with
    a) Detection of sample
    b) Injection of sample
    c) Purification of mobile phase
    d) Amplification of signal

15. Programmed Temperature Gas Chromatography involves
    a) Derivatization of the nonvolatile sample to its volatile form
    b) Programmimg the temperature of the column oven during separation
    c) Programmimg the time of the carrier gas in column during separation
    d) Programmimg the flow rate of the carrier gas in column during separation

16. A mixture of compounds A, B , C and D after separation on C18 column showed retention times of 5 min, 7 min, 10 min and 15 min respectively. If the same mixture is separated on normal silica gel HPLC column, _____compound will be eluted first.
    a) A
    b) B
    c) C
    d) D

17. Peak purity analysis in HPLC is feasible with the use of _____ detector.
    a) Variable wavelength UV Detector
    b) Fluorescence Detector
    c) Refractive Index detector
    d) Photo Diode Array Detector

18. Ion exchange resins containing quaternery ammonium functional group, are____
    a) Strong cation exchangers
    b) Strong anion exchangers
    c) Weak cation exchangers
    d) Weak anion exchangers

19. Dextran gel , popular as Sephadex, used in gel chromatography is a polymers of ____units
    a) Glucose
    b) Polyacrylamide
    c) Agarose
    d) Amino acid

20. In affinity chromatography, the component which is used to extend the recognizer molecule from the stationary phase surface
    a) Spacer arm b) Ligand
    c) Application buffer d) Elution buffer

Q II. Long answer questions (Attempt any two out of three) 20M

1. A) Explain different types of electronic transitions occurring in molecules studied by UV–Visible spectroscopy with examples.
   B) Enlist different radiation sources used in IR spectroscopy. Discuss the any one detector in IR spectroscopy.
2. A) Give van deemeter equation stating what each term in it stand for. Give any three points differentiation between Isocratic and Gradient elution.
   B) Give an elaborative account of Affinity chromatography. Give its one application.
3. A) A chromatogram of a mixture M and N provided the following data when analyzed on 30 cm ODS column.

Name of the compound	Retention time (min)	Width at half the peak height (min)
Unretained Solute	3.0	-
M	6.7	0.3
N	16.8	0.2

Calculate resolution between species M and N. Calculate number of theoretical plates For component M. Comment on polarity of M and N.
B) Enlist any four detectors use in gas Chromatography. Discuss any one in detail

Q III. Short answer questions (Attempt any seven out of nine) 35M

1. Enlist Factors affecting fluorescence intensity If a 20 µg/ml of compound B gives an absorbance of 0.433 at wavelength 272nm in 2cm cell. What is the concentration of compound B (µg/ml) in a solution which shows absorbance of 0.204 in 1cm cell at same wavelength?
2. Describe the Instrumentation of a fluorimeter with a neat labeled diagram. Write any two applications of fluorimetry in pharmaceutical analysis.
3. Write the principle and explain the instrumentation with help of suitable diagram for Flame photometer.
4. Discuss the instrumentation and any two applications of Atomic absorption spectroscopy.
5. Give one point of differentiation between normal phase and reverse phase chromatography. Enlist steps involved in separation using Thin Layer Chromatography. Give any two application of Thin Layer Chromatography
6. Explain the principle and methodology of column chromatography with a neat labeled diagram.
7. Draw a schematic diagram of a Gas chromatograph. Explain the roll of each component in the same.
8. With reference to HPLC, classify the solute property and bulk property detectors in HPLC giving one example of each of the type. Give any two advantages of solute property detectors over bulk property detectors
9. Write principle involved in separation of mixture components using Gel chromatography. Comment on the terms Exclusion Limit and Inclusion limit of the gel material and its significance in the separation process using Gel Chromatography