

SPECTROSCOPY

Long Essay Questions

10 marks

1. Describe and derive the equation for beer 's – lambert's law. add a note on limitations of beers law

Short Essay Questions

5 Marks

1. Define electromagnetic radiation. Explain emission and absorption spectra.
2. Describe and derive the equation for beer 's – Lambert's law
3. Explain the reasons for Beer's law?
4. Write the statement and derive the equation for Beer's law.
5. Write the statement and derive the equation for lambert's law
6. Explain the various electronic transitions occurred in uv visible spectroscopy?
7. Explain the effect of solvent and ph on absorption spectra
8. Explain the different method of single component analysis of drug?
9. Explain the multiple component analysis of drugs?
10. What is spectroscopy? Classify with examples

Short Answers

2 Marks

1. Define the terms a) Wavelength b) frequency c) wave number d) Absorption
2. Define chromophore and auxochrome
3. Define bathochromic shift and hypsochromic shift
4. Define hyperchromic effect and hypochromic effect
5. Define absorptivity and transmittance
6. What is extinction co-efficient? How it is determined?
7. What is molar extinction co-efficient? How it is determined
8. Write effect of solvent on absorption UV-Visible radiation by the molecules.
9. Write the effect of pH on absorption of electromagnetic radiation by the molecules.
10. What is multicomponent analysis? Write the application of beer's in analysis of drugs.
11. What is Vierordt's method of simultaneous estimation of drugs?
12. Write any two method of single component analysis of drugs.
13. What is standard calibration curve method?
14. What are K bands and R bands?
15. What are E band and B band?
16. What are K band and B band?
17. What are E band and R band?
18. What are forbidden transition and allowed transition?

ABSORPTION SPECTROSCOPY

Long Essay

10 Marks

1. Explain the transitions involved in the UV-Visible spectroscopy. Emphasis on electromagnetic radiation and the various energy levels in organic chromophores.
2. What are the essential components of a Spectrophotometer? Draw a diagrammatic sketch and explain the functions and working of each unit.
3. Describe the construction and working of a double-beam spectrophotometer with a neat diagram and its applications.
4. Explain in brief: (a) Interference filters (b) Barrier layer cell (c) Gratings (d) PMT
5. Write a note on Spectrophotometric Titrations and give its applications. Discuss the determination of Equilibrium constant by spectroscopy.
6. Discuss elaborately instrumentation of uv visible spectroscopy with schematic block diagram
7. Draw a neat label diagram of double beam spectrophotometer. Describe the source of radiation and monochromators used in uv spectroscopy
8. Explain various spectrophotometric titrations with suitable graphs/

Short Essay

5 marks

1. Define electronic spectroscopy. Discuss various types of electronic transitions with suitable examples
2. Discuss the various factors which are effect on uv visible spectroscopy
3. Discuss the theory of uv and visible spectroscopy.
4. Explain the principle involved in colorimetry
5. Write the construction and working of prism type of monochromators
6. Explain the construction and working of gratings
7. Explain the construction and working of phototube with merits and demerits
8. Describe the construction and working of photo multiplier tube with neat labeled diagram
9. Describe the construction and working of barrier layer cell with neat labeled diagram
10. Explain the measurement of equilibrium constant and rate constant by uv visible spectroscopy

Short Answers

2 marks

1. What is transition? Classify?
2. Write the statement of beers law
3. Write the statement of lamberts law
4. Name the radiations source used in uv spectroscopy
5. Name the radiation source used in colorimerty
6. Name the different filters used in colorimetry
7. Write the importance of mono chromator
8. What is monochromator ?clasify?
9. What is absorpition maxima?write its significance ?
10. Write the differences between uv and visible spectroscopy
11. Write the advantages of double beam spectrophotometer

www.FirstRanker.com

IR SPECTROSCOPY

Long Essay

10 marks

1. Discuss the determination of Rate constant by spectroscopy. Explain briefly about sample cells and radiation sources used in IR.
2. Describe the instrumentation of an IR spectrometer. Draw labeled diagram.
3. Write a note on theory and applications of IR spectrophotometry. Explain different sampling techniques employed in IR spectroscopy.
4. What are the different vibrational modes of polyatomic molecules upon IR absorption? Write in brief on the various detectors used in IR Spectroscopy.
5. With reference to molecular factors, discuss the theory underlying Infra-red spectrometric techniques. Describe some characteristic absorption bands with their probable region for the following functional groups:
 - i. Aldehydes
 - ii. Esters
 - iii. Amides
 - iv. Alcohol
 - v. Carboxylic acid.
6. Explain the theory involved in IR spectroscopy with brief outline of IR spectroscopy instrumentation
7. Define ir spectroscopy ? Describe the basic requirements of absorption of ir radiation by molecules. Enumerate the various fundamental molecular vibrations in ir spectrum.

Short Essay

5 Marks

1. Explain in detail the theory of ir spectroscopy
2. Discuss the various sample handling techniques in ir spectroscopy
3. Explain the construction and working of bolometer and thermocouple detector used in ir spectroscopy
4. Explain the construction and working of golay cells and thermocouple detector used in ir spectroscopy
5. Explain the construction and working of golay cells and bolometer detector used in ir spectroscopy
6. Briefly explain the radiation sources used in ir specphotometer
7. Write the construction and working of double beam spectrophotometer

Short answers

1. What is ir spectroscopy? write its frequency region?
2. Name the radiation sources used in ir spectroscopy

3. What is finger print region ? give its significance
4. Define a) functional group region b) finger print region
5. Write the vibrational frequency of alcohol, carboxyl group and amide
6. Write the vibrational frequency of alcohol, aldehyde and amide
7. Write the vibrational frequency of amide, amine and ketone
8. Write the vibrational frequency of carboxyl group, aldehyde and amide
9. Write the importance of Hook's law in IR spectroscopy
10. Write the formula used to calculate number of fundamental vibration for Linear and Nonlinear molecules.
11. What are stretching and bending vibrations?

www.FirstRanker.com

FLUORIMETRY

Short Essay

5 marks

1. Explain the phenomenon of Fluorescence and Phosphorescence. Write the requirement of molecules to exhibit fluorescence.
2. Explain the principle and theory involved Fluorimetry.
3. Describe the factors which affect the fluorescence intensity.
4. Explain the instrumentation of fluorimetry with neat labeled block diagram
5. What is Quenching? Enumerate the various factors which influence quenching effect.
6. Discuss the working principle and construction of spectrophotometer.
7. Enlist the application of fluorimetry in quantitative analysis of drugs.
8. What is quenching? Give the reasons for quenching
9. Mention the advantages of fluorescent methods of analysis. Why must fluorescent assay be carried out at high dilution?
10. Define and distinguish between fluorescence and phosphorescence. Write the various factors affecting the phenomenon of fluorescence

Short Answers

2 Marks

1. Define Fluorescence and Phosphorescence
2. What is Quenching? Give example
3. Define a) Singlet ground state b) Singlet excited state
4. Write differences between singlet ground state and triplet state
5. What are primary and secondary filters?

FLAME EMISSION AND ATOMIC ABSORPTION SPECTROMETRY

Short Essay

10 marks

1. What is Flame emission photometry? Write the theoretical aspects of flame emission photometry.
2. What is atomic absorption spectroscopy? Write the principle involved in atomic absorption spectroscopy.
3. Explain the construction and working of flame emission spectrometry with neat labeled diagram.
4. Explain the instrumentation and working of atomic absorption spectroscopy.
5. Describe the construction of burners used in flame photometry with diagram.
6. Discuss the various types of interference occurred in flame photometry.
7. Discuss the differences between flame emission and atomic absorption spectroscopy.
8. Write the applications of flame emission and atomic absorption spectrometry

Short Answer

2 marks

1. What is flame photometry?
2. What is atomic absorption spectroscopy?
3. Name the fuel gases used in flame emission spectroscopy.
4. Write the significance of hollow cathode lamp in atomic absorption spectroscopy.
5. Name the burners used in flame photometry.
6. Write the applications of Flame emission spectroscopy
7. What are the events that occur when the compound of a metal to be investigated is aspirated into a flame?
8. What are different interferences in flame photometry?
9. Write the applications of Atomic Absorption spectroscopy
10. Name the detectors used in Flame Photometers

NEPHELOMETRY AND TURBIDIMETRY

Short Essay

5 marks

1. What are Nephelometry and turbidimetry? Write principle involved for the same
2. Describe the construction and working of Nephelometer.
3. Write the differences between nephelometry and turbidimetry
4. Write the application of nephelometry and turbidimetry.

Short Answers

2 marks

1. What are nephelometry and turbidimetry?
2. How do you differentiate fluorimeter and nephelometer?
3. How do you differentiate colorimeter and turbidimeter?
4. Write the block diagram of Nephelometry
5. Write the block diagram of turbidimetry.
6. Write the application of Nephelometry
7. Write the applications of turbidimetry.
8. Why detector placed perpendicular to incident radiation in nephelometry ?
9. Write difference between visible spectrophotometer with nephelometer.
10. Write difference between UV spectrophotometer with nephelometer.
11. Write the radiation source and detector used in Nephelometer.
12. Write the radiation source and detector used in Turbidimeter.

www.FirstRanker.com

CHROMATOGRAPHY

Short Essay

5 marks

1. Define chromatography. Classify with examples
2. Explain the principles of chromatography
3. Write the ideal characteristics of stationary phase and mobile phase

Short Questions

2 marks

1. What are stationary phase and mobile phase
2. What is adsorption chromatography? Give example
3. What is partition chromatography? Give example
4. Write the difference between normal phase and reverse phase chromatography
5. Write the advantages of reverse phase chromatography.
6. What is planar chromatography? Give any two example
7. What is normal phase chromatography? Write its demerits
8. What is reverse phase chromatography? Write its significance
9. Write the difference between planar and column chromatography
10. Name the different working principles of chromatography
11. Write the importance of reverse phase chromatography in analysis of drugs
12. Why reverse phase chromatography gain more importance in analysis of drug components?

PAPER CHROMATOGRAPHY

Short Easy

5 marks

1. Write the practical aspects of paper chromatography.
2. Enlist and explain the various development techniques in paper chromatography
3. Briefly explain the different detection methods of paper chromatography

Short Answers

2 marks

1. What is paper chromatography?
2. Define R_f and R_x value.
3. What is R_m value? Write its significance
4. What is elutropic series of solvents?
5. What is two dimensional paper chromatography?
6. Write the composition and types of paper used in paper chromatography.
7. Write the limitations of paper chromatography.
8. Write the application of paper chromatography
9. What is radial paper chromatography?
10. Write the principle of paper chromatography.

www.FirstRanker.com

THIN LAYER CHROMATOGRAPHY

Short Essay

5 marks

1. Write the advantages and disadvantages of thin layer chromatography
2. Explain the practical steps involved in TLC for separation of components
3. Explain the various methods of preparation of TLC plates
4. What are adsorbents? write the ideal properties of adsorbents used in TLC
5. Describe the development techniques of thin layer chromatography
6. Enlist and explain the different detection methods involved in thin layer chromatography
7. Discuss the various applications of paper chromatography

Short Answers

2 marks

1. List the requirement of TLC techniques
2. What is activation of plates? Write its importance
3. What is edge effect? How do you correct it?
4. Write the advantages of TLC over paper chromatography.
5. Name the specific and non specific methods used to detect the component in TLC
6. What is two dimensional thin layer chromatography? Write its applications
7. Write the difference of silica gel, Silica gel G, silica gel GF.
8. What is Stahl's triangle? Write its significance
9. What is binder? Why it is used in TLC?
10. Write the difference between TLC with paper chromatography.

COLUMN CHROMATOGRAPHY

Short Essay

5 marks

1. Briefly explain the operational techniques of column chromatography
2. Write the principle and advantages of column chromatography
3. Explain the factors affecting column efficiency of column in column chromatography
4. Explain the packing method of adsorbent in column chromatography with their merits and demerits
5. Explain the separation techniques involved in column chromatography
6. Describe the elution methods of column chromatography
7. Write the applications of column chromatography in pharmacy

Short Questions

2 marks

1. What is column chromatography? Classify
2. Mention the detection methods of column chromatography
3. Write the difference between isocratic and gradient elution
4. Define wet packing and dry packing
5. What is partition column chromatography? Write its significance
6. What is elution analysis?
7. What is frontal analysis?
8. What is displacement analysis?
9. Classify the adsorbents used in column chromatography
10. Define eluent, eluate and elution

HPTLC

Short Essay

5 marks

1. Write the steps involved in separation of molecular mixture by HPTLC methods
2. Write the differences between HPTLC and TLC

Short Answers

1. What is HPTLC?
2. Write the application of HPTLC in analysis
3. Name the detection methods in HPTLC
4. Write the advantages of HPTLC over TLC

www.FirstRanker.com

ION EXCHANGE CHROMATOGRAPHY

Short Essay

5 marks

1. Explain the manufacture of cation exchange resin and anion exchange resin
2. What are ion exchange resins? Explain the ideal properties of ion exchange resins
3. Give an account of mechanisms of ion exchange process in ion exchange chromatography
4. Explain the operational techniques of ion exchange chromatography
5. List out the important applications of ion exchange chromatography

Short Answers

2 marks

1. What are ion exchange resins? Classify
2. Write the principle of ion exchange chromatography
3. Give the example for anion and cation exchange resins
4. How do you regenerate cation and anion exchange resin
5. Define a) Ion exchange resin b) Ion exchange capacity
6. Write the applications of ion exchange chromatography

www.FirstRanker.com

HPLC

Long Essay

10 marks

1. Describe the instrumentation and applications of H.P.L.C.
2. Explain about the various detectors used in HPLC. Compare and contrast GC with HPLC.

Short Essay

5 marks

1. Explain the instrumentation of HPLC with block diagram
2. Write the construction and working of displacement pump with advantages and disadvantages
3. Explain the different sample injection system followed in HPLC
4. Write the columns and column packing material used in HPLC
5. Write the construction, working and demerits of UV detector used in HPLC
6. Explain in brief refractive and fluorimetric detector used in HPLC

Short Answers

2 marks

1. Write the advantages of HPLC
2. What is Guard column? Write its significance
3. Name the pumps used in HPLC instrument
4. Define retention time and retention volume
5. Why HPLC more superior than GLC
6. Name the detectors used in HPLC techniques
7. What do you mean by bulk property and solvent property detector
8. Write the few important applications of HPLC methods

SIZE EXCLUSION CHROMATOGRAPHY

Short Essay

5 marks

1. Explain the principle and theory of size exclusion chromatography
2. Write the practical steps involved in size exclusion chromatography

Short Answer

2 marks

1. What is Size exclusion chromatography?
2. What is gel? Classify
3. Name the natural and synthetic gels used in size exclusion chromatography
4. Write the applications of Size exclusion chromatography

www.FirstRanker.com

GAS CHROMATOGRAPHY

Long Essay

10 marks

1. Describe Gas Chromatograph with a neat labelled diagram. Explain the type of GC columns and carrier gases used.
2. Explain about the different derivatizations and detectors used in Gas Chromatography.
3. Discuss in detail about rate theory with support of Vandeemter equation. Narrate about the pumps used in HPLC.
4. Explain the concept of Plate theory for increasing the efficiency of chromatographic columns. Add a detail note on sample injection system in GC.
5. Explain about column efficiency with the help of 'Plate theory' and 'Rate theory'.
6. Discuss the ideal properties of detectors used in GC. Write the principle and working of Electron Capture detector.
7. Explain about the programmed temperature GC. Define retention time, HETP, resolution factor, selectivity factor and dead time. Applications of Gas chromatography.
8. Explain the principle and working of thermal conductivity and flame ionization detectors. Various column packing used in GC
9. Describe in brief instrumentation of gas chromatography with neat labeled block diagram

Short Essay

5 marks

1. Explain the rate theory with the support of Van deemter equation for enhancing the column efficiency
2. Explain the concept of plate theory for increasing the efficiency of column in gas chromatography
3. Write the column material and preparation of chromatographic column in gas chromatography
4. Write the construction and working of thermal conductivity detector with their marits and demerits
5. Write the working principle and construction of Flame ionization detector with neat labeled diagram
6. Write the working principle and construction of electron captured detector with neat labeled diagram
7. What is derivatization? Explain the various methods of derivatization in gas chromatography.
8. Explain the applications of gas chromatography in analysis

Short Answers

2 marks

1. What is gas chromatography? Classify
2. Write the advantages of Gas chromatography
3. Define a) Number of theoretical plates b) HETP
4. Define a) Fronting b) Tailing
5. What is eddy's diffusion?
6. Define a) Resolution b) Capacity factor
7. Write the ideal properties of carrier gas used in gas chromatography
8. Name the ideal carrier gas used in Gas chromatography
9. Name the detectors used in gas chromatography
10. What is programmed temperature gas chromatography? Write its importance
11. Name the stationary phase used in gas liquid chromatography
12. What is derivatization? Write its significance
13. Write the limitations of gas chromatography.

www.FirstRanker.com

ELECTROPHORESIS

Short Essay

5 marks

1. Write the theoretical aspects of electrophoresis for separation of molecular mixture
2. Write the factors affecting migration of ionic components in electrophoresis
3. Describe the practical steps involved in paper electrophoresis
4. Explain the concept of moving boundary electrophoresis with neat labeled diagram
5. Write the principle and working of isoelectric focusing electrophoresis
6. Give an account of gel electrophoresis with representation of neat diagram
7. What is zone electrophoresis? Explain any one in detail.
8. Write the difference in theoretical and practical aspects of zone and moving boundary electrophoresis.

Short Answers

2 marks

1. What is electrophoresis? Classify
2. What is paper electrophoresis? Classify

www.FirstRanker.com

POTENTIOMETRY

Long Essay

10 marks

1. Write the construction and working of any one indicator electrode and reference electrode with their merits and demerits.
2. Write the principle of potentiometry. Describe the construction, working, advantage and disadvantages of glass electrode.

Short Essay

5 marks

1. Explain the principle of potentiometry for determining the electrode potential by Nernst equation.
2. Write the construction and working of normal hydrogen electrode with neat labeled diagram
3. Write the construction and working of Glass electrode with advantages and disadvantages
4. Explain the construction, working, merits and demerits of calomel electrode.
5. Explain the construction, working, merits and demerits of Quinhydrone electrode.
6. Write the working principle and construction of any one Reference electrode.
7. Write the working principle and construction of any one Indicator electrode.
8. Brief out the potentiometric titrations with their merits and demerits
9. Explain the various methods of detecting end point in potentiometric titrations.
10. Write the applications of potentiometry

Short Answers

2 marks

1. What are reference and indicator electrode?
2. What is reference electrode? Give examples
3. What is indicator electrode? Give examples
4. What is null point potentiometry?
5. Write the importance of Nernst equation.
6. What is electrochemical cell?
7. What is potentiometer? Write its importance.
8. What is potentiometric titration?
9. What is dead stop end point titration?
10. Write the advantages of potentiometric titrations over conventional titration methods

CONDUTOMETRY

Short Essay

5 marks

1. Explain the theory and principle of conductometry
2. Explain the conductometric titration curves for strong acid with strong base and strong acid with weak base.
3. Explain the conductometric titration curves for weak acid with strong base, weak acid with weak base and very weak acid with strong base.
4. Explain the conductometric titration curves of displacement and precipitation titrations
5. Explain the conductometric titration curves – a) strong acid with strong base b) mixture of strong acid and weak acid with strong base
6. Write the application of conductometry in pharmaceutical analysis
7. Compare the merits and demerits of Conductometric and potentiometric titrations
8. Discuss in brief construction and working of electrochemical cell
9. Discuss the construction and working of conductivity meter
10. Discuss the principles involved in conductometric titrations with the aid of graphs.

Short Answers

2 marks

1. What is conductometry?
2. Define molar conductance and equivalent conductance
3. Define conductance and resistance
4. What is conductivity cell?
5. What is conductometric titration?
6. Write the differences between conductometry and potentiometry

NMR SPECTROSCOPY

Short Essay

5 marks

1. Describe the theory of NMR spectroscopy
2. Briefly explain the instrumentation of proton NMR spectroscopy with block diagram

Short Answers

2 marks

1. What is NMR spectroscopy? Classify
2. What is chemical shift? Write its importance
3. What are the applications of NMR spectroscopy?
4. List out the main component of NMR instrument.
5. Write the principle of NMR.
6. Why carbon-12 does not exhibit NMR spectra?
7. Name the internal standard used in NMR spectroscopy.
8. Write the difference between NMR and Mass spectroscopy.

www.FirstRanker.com

MASS SPECTROSCOPY

Short Essay

5 marks

1. Explain the basic principle of mass spectroscopy.
2. Explain the different types of ions generated in mass spectroscopy
3. Brief out the component of mass spectroscopy instrument.

Short Answers

2 marks

1. What is mass spectroscopy?
2. Define molecular ion and fragment ion
3. Write the applications mass spectroscopy.
4. Name the component of mass spectrophotometer.
5. Write the importance of fragmentation of molecules.
6. Write advantages of mass spectroscopy with IR spectroscopy
7. Write spectral representation of mass spectrum.

www.FirstRanker.com

X-RAY DIFFRACTION

Short Essay

5 marks

1. Briefly explain the theory of x-ray diffraction method.
2. Write statement of Bragg's law and derive the equation of Bragg's law

Short Answers

2 marks

1. What is X – ray diffraction?
2. Write the statement of Bragg's law.
3. Write the important application of x-ray diffraction spectroscopy
4. How X-ray radiation is generated?
5. Write the principle of X-ray diffraction.

www.FirstRanker.com

QUALITY ASSURANCE

Short Essay

5 marks

1. Write the importance of quality control and quality assurance in pharmacy.
2. Explain the sources of quality variations
3. Describe the validation methods with example

Short Answers

2 marks

1. What is validation? classify
2. Define quality control and quality assurance
3. Write the difference between quality control and quality assurance.
4. Write the importance of quality control in pharmacy
5. Write the importance of quality assurance in pharmacy
6. Write the sources of quality variations.
7. What is a quality variation?
8. What do you understand by validation?
9. Write the significance of validation in analysis
10. Name the sources of quality variations.

www.FirstRanker.com