

FOURTH YEAR B.PHARM. EXAM

PAPER IV – MODERN METHODS OF PHARMACEUTICAL ANALYSIS

Q.P. Code: 564270

Time: Three Hours

Maximum: 100 marks

(180 Min) Answer ALL questions in the same order.

I. Elaborate on:

Pages Time Marks
(Max.)(Max.)(Max.)

- | | | | |
|--|----|----|----|
| 1. (a) Define Chemical Shift. Explain the factors affecting chemical shift. | | | |
| (b) Write the principle, working procedure, types and applications of Radio Immuno Assay. | 19 | 33 | 20 |
| 2. (a) Write the theory, apparatus, working and applications of Polarography. | | | |
| (b) Define electrophoresis. Explain in detail about Gel electrophoresis and Capillary electrophoresis. | 19 | 33 | 20 |

II. Write notes on:

- | | | | |
|--|---|---|---|
| 1. Write a note on ultracentrifugation. | 3 | 8 | 5 |
| 2. Explain the types of columns used in High Performance Liquid Chromatography. | 3 | 8 | 5 |
| 3. What are the types of ion exchange resins used in ion exchange chromatography? Explain. | 3 | 8 | 5 |
| 4. Write the identification and quantification procedures involved in the separation of individual components from mixture by Thin Layer Chromatography. | 3 | 8 | 5 |
| 5. Write the principle involved in the separation of amino acids by Paper Chromatography. Explain the reaction of amino acid with Ninhydrin reagent. | 3 | 8 | 5 |
| 6. Write the principle, instrumentation and applications of Nephelometry. | 3 | 8 | 5 |
| 7. Explain the sampling techniques for solids in IR Spectrophotometry. | 3 | 8 | 5 |
| 8. How will you calculate λ max by Woodward –Fischer rule? | 3 | 8 | 5 |

III. Short Answers:

- | | | | |
|---|---|---|---|
| 1. Bathochromic shift and Hypsochromic shift. | 1 | 5 | 2 |
| 2. Relationship between concentration and fluorescence intensity. | 1 | 5 | 2 |
| 3. Hollow Cathode Lamp. | 1 | 5 | 2 |
| 4. Reverse Phase Chromatography. | 1 | 5 | 2 |
| 5. Junction potential. | 1 | 5 | 2 |
| 6. Equivalent Conductance and Molecular conductance. | 1 | 5 | 2 |
| 7. Spin – Spin Coupling. | 1 | 5 | 2 |
| 8. Molecular ion peak. | 1 | 5 | 2 |
| 9. Capacity factor. | 1 | 5 | 2 |
| 10. Nernst – Glower. | 1 | 5 | 2 |

(LC 4270)

FEBRUARY 2013

Sub. Code: 4270

FOURTH YEAR B.PHARM. EXAM
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS

Q.P. Code: 564270

Time: Three Hours
(180 Min)

Maximum: 100 marks

I. Elaborate on:

(2X20=40)

1. Derive an expression for beer-lamberts law and write the general principle, construction working of double beam UV spectrophotometer.
2. a) Write the principle and applications of counter current extraction and gel filtration.
b) Explain the principle and various types of curves in conductometric titrations.

II. Write notes on:

(8X5=40)

1. Explain the sample handling techniques in IR spectroscopy.
2. Explain the principle involved in nephlo- turbidimetry.
3. Write the sampling procedure as per GLP.
4. Explain the factors affecting fluorescence intensity.
5. What are the different detection techniques used in paper chromatography.
6. What are the Pharmaceutical applications of X-ray diffraction?
7. What are the different methods available to induce ionization of a sample in mass spectroscopy.
8. Explain amperometric titration curves with example.

III. Short Answers on:

(10X2=20)

1. Define the term Retention time.
2. What is chemical shift in NMR.
3. Explain Bathochromic shift.
4. Photoelectric colorimeter.
5. Detectors used in Gas chromatography.
6. Give advantages of preparatory HPTLC plates.
7. Define singlet and triplet states.
8. Define diffusion current and residual current.
9. Explain dead stop end point technique.
10. Write any two factors which influence vibrational frequencies.

(LD 4270)

AUGUST 2013

Sub. Code: 4270

FOURTH YEAR B.PHARM. EXAM
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS

Q.P. Code: 564270

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X20=40)

1. a. Write in details about the principle involved in spectroscopy
b. Write the principle, working principle and application of Nephelo turbidimetry
2. a. Write the theory & Principle in IR Spectroscopy
b. Write the principle and working principle of Gas chromatography with a neat diagram

II. Write notes on:

(8X5=40)

1. Standard calomel electrode
2. Rheodyne injector
3. Electron Capture detector
4. a. Diffraction grating b. Transmission Grating
5. a. M +1 peak b. M + 2 peak c. Base peak
6. Principle involved in paper chromatography
7. Polarography
8. Counter current extraction

III. Short Answers on:

(10X2=20)

1. Nernst Equation
2. Dipole moment
3. Partition coefficient
4. Static Quenching
5. What is deuterated solvents
6. How will you measure cell constant in conductometry
7. R_f , R_x , R_m
8. Principle of separation on GLC
9. Five Examples for non reducible ions.
10. Half wave potential

(LE 4270)

FEBRUARY 2014

Sub. Code: 4270

FOURTH YEAR B.PHARM. EXAM
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS

Q.P. Code: 564270

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X20=40)

1. a. Write in detail about the principles involved in chromatography
- b. Write the principle and working principle of HPLC with a neat diagram
2. a. Write the principles involved in UV spectroscopy
- b. Explain the principle and working principle of IR spectroscopy

II. Write notes on:

(8X5=40)

1. Explain the principle involved in Fluorimetry.
2. Flame Spectrophotometer
3. a. Photo Multiplier tube b. Photo Voltaic cell
4. Glass electrode
5. Gel filtration
6. Principle involved in NMR Spectroscopy
7. Different type of development techniques in paper chromatography
8. Give a brief account on ISO 9000, TQM

III. Short Answers on:

(10X2=20)

1. Explain HETP
2. Principle of Separation in GSC
3. Isocratic elution
4. Self quenching
5. Diffusion current
6. Nernst global
7. Methods of detection in TLC
8. ODS
9. Examples of Maxima suppressors
10. Isobestic Point

FOURTH YEAR B.PHARM. DEGREE EXAMINATION**Paper IV - MODERN METHODS OF PHARMACEUTICAL ANALYSIS***Q. P. Code: 564270***Time: Three Hours****Maximum: 100 Marks****Answer All Questions****I. Essay Questions:****(2 x 20 = 40)**

1. a) Write the principle, preparation, procedure and method of detection in Column chromatography.
b) What are the different carrier gases used in gas chromatography and what are the ideal requirements of the carrier gas. Also give the application of gas chromatography.
2. a) Give the principle, theory instrumentation of mass spectrometer and application of mass spectroscopy.
b) Describe the principle and instrumentation involved in Flame emission spectroscopy.

II. Short Notes:**(8 x 5 = 40)**

1. Describe with neat diagram the working principles of nepheloturbidimeter.
2. Explain the different types of detection technique used in paper chromatography.
3. Explain the current voltage curve and various currents in polarographic measurements.
4. Explain amperometric titrations of curves with example.
5. What is principle and procedure for ultra-centrifuge?
6. Explain shielding, de-shielding and spin coupling in NMR spectroscopy.
7. Describe the parameters of analytical method validation.
8. Write on Radioimmunoassay.

III. Short Answers:**(10 x 2 = 20)**

1. Define Chromophores and Auxochromes.
2. Explain photoelectric colorimeter.
3. What is R_f value and retention volume?
4. Explain the term quenching.
5. What is finger print region?
6. Draw the conductometric titration curve for a strong acid vs a mixture of strong and weak base.
7. Give Bragg's equation in x-ray diffraction technique.
8. What are polarographic suppressors?
9. What is function of filter and monochromator?
10. Explain electrochemical cell.

(LG 4270)

FEBRUARY 2015

Sub. Code: 4270

**FOURTH YEAR B.PHARM. EXAMINATION
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 marks

I. Essay:

(2 x 20 = 40)

1. a) Write in detail about work principle and application of Fluorimeter.
b) Write the principle application and advantage of Amperometry.
2. a) Write a detail account on Ion exchange chromatography.
b) Write the principle, application advantage in TLC.

II. Short notes:

(8 x 5 = 40)

1. Katharometer
2. Column Chromatography
3. Electrophoresis
4. GLP
5. Hydrogen electrode
6. Ultra centrifugation
7. Give the application of colorimetry
8. HPTLC

III. Short answers:

(10 x 2 = 20)

1. Diffusion current
2. Give examples for indicator electrode
3. Chemical shift
4. Retention Volume
5. Auxochrome
6. Write the different types of monochromator
7. Tailing factor
8. What is Parent peak?
9. What's the expression for beers lamberts law?
10. Finger print region

B.PHARM. DEGREE EXAMINATION**FOURTH YEAR****PAPER IV – MODERN METHODS OF PHARMACEUTICAL ANALYSIS***Q.P. Code: 564270***Time : Three Hours****Maximum : 100 marks****Answer ALL questions****I. Essay:****(2 x 20 = 40)**

1. a) Write the theory and instrumentation of Polarography.
b) Write the deviations from Beer's law.
c) Write the sampling techniques used in IR spectrophotometry.
2. a) Explain the detectors used in Gas Chromatography.
b) Explain in detail about chemical shift and spin-spin coupling.

II. Short notes :**(8 x 5 = 40)**

1. Write a note on Radio immuno Assay.
2. What are the methods used to find the distance between the crystal plane by X –ray diffraction analysis? Explain the working of Bragg's spectrometer.
3. Write a note on electron impact ionization.
4. How will you measure conductance? Explain with neat diagram.
5. Write the different types of electrodes used in electrochemical methods of analysis. Explain the construction and working of Saturated Calomel Electrode.
6. Write a note on moving boundary electrophoresis.
7. Explain the factors affecting the intensity of fluorescence.
8. How will you calculate λ max by Woodward – Fischer rule?

III. Short answers:**(10 x 2 = 20)**

1. Define Equivalent conductance
2. What is Reverse Phase Chromatography?
3. Define Resolution
4. List any two stationary phase used in TLC.
5. Define RF value and R_x value
6. Mention the light source and detectors used in AAS.
7. List any four detectors used in IR spectroscopy.
8. Define Quenching.
9. Define Bathochromic shift and Hypsochromic shift.
10. Define Electrode potential. Mention example for indicator electrode.

(LI 4270)

FEBRUARY 2016

Sub. Code: 4270

**FOURTH YEAR B.PHARM. EXAMINATION
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Essay: (2 x 20 = 40)

1. a) Write the principle, instrumentation and applications of UV-Vis Spectrophotometry.
2. a) Explain the principles and applications of AAS.
b) Explain the working principle and instrumentation of fluorimetry with a neat labeled diagram.

II. Short notes: (8 x 5 = 40)

1. Explain the construction and working of Hydrogen electrode.
2. Write a note on ultracentrifugation.
3. Explain briefly the preparation & activation of TLC plates.
4. List the various detectors used in HPLC. Explain in detail the working principle of UV detector with a neat labeled diagram.
5. Write a note on Electron Spin Resonance spectroscopy.
6. Write short notes on conductometric titrations.
7. Describe the instrumentation of NMR with a neat diagram.
8. Write a note on sample handling in IR spectroscopy.

III. Short answers: (10 x 2 = 20)

1. What is Retention time and R_f value?
2. Define isocratic & gradient elution.
3. Write any two advantages of Amperometric titrations.
4. Write Nernst equation. What is its significance?
5. Define migration current.
6. Define fluorescence.
7. Define hypso chromic and hyper chromic shift.
8. Write any two applications of Nephelo-turbidimetry.
9. List various types of cation and anion exchangers.
10. Define Base peak.

(LJ 4270)

AUGUST 2016

Sub. Code: 4270

**FOURTH YEAR B.PHARM. EXAMINATION
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Essay: **(2 x 20 = 40)**

1. With a neat diagram, explain the principle, different vibrational modes of molecules, instrumentation and applications of Infrared spectrophotometer.
2. a) Explain the principle and instrumentation of flame emission spectroscopy.
b) Describe the principle and different types of conductometric titrations with examples.

II. Short notes: **(8 x 5 = 40)**

1. Explain the various factors that affect the fluorescent intensity.
2. Describe the working principle and instrumentation of nephelometer.
3. Explain the different type of electronic transitions involved in UV spectroscopy with examples.
4. Describe the construction and working of dropping mercury electrode with a diagram.
5. Describe briefly the various parameters involved in the calibration and validation of analytical instruments.
6. Explain the principle, different type of ion exchange resins and mechanism involved in ion exchange chromatography.
7. Explain the principle and applications of X-ray diffraction technique.
8. Explain the various methods of detection of compounds in thin layer chromatography.

III. Short answers: **(10 x 2 = 20)**

1. Define chromophore and hypsochromic shift.
2. Define retention time and retention volume.
3. What is ultracentrifugation?
4. List at least four different type ions produced in mass spectra.
5. What is HETP? How it is related to number of theoretical plates and length of the column?
6. Mention two examples each of reference and indicator electrode.
7. Define finger print region.
8. Write any two differences between NMR and ESR.
9. Define tailing factor.
10. Write any two limitations of GLC.

(LK 4270)

FEBRUARY 2017

Sub. Code: 4270

**B.PHARM. EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Explain the process of fluorescence with diagram.
b) Discuss various reasons for the reduction in fluorescence intensity of a molecule.
2. a) Write on Bragg's Law.
b) Elaborately write on different reference electrodes used in potentiometry.

II. Write notes on:

(8 x 5 = 40)

1. With a neat labelled diagram explain double beam UV spectrophotometer.
2. Explain different amperometric titration curves with examples.
3. Give an account on current voltage curve in polarography.
4. Write the principle and applications of nuclear magnetic resonance.
5. Enumerate basic concepts of TQM.
6. Write principle and factors affecting Nephlo-turbidimetry.
7. Write the advantages and differences of HPTLC compared to TLC.
8. What are the modes of vibrations occur in IR spectroscopy.

III. Short answers on:

(10 x 2 = 20)

1. What is a molecular ion peak?
2. Name the instrument components of atomic absorption spectroscopy.
3. Write two applications of flame emission spectroscopy.
4. What is the Gradient elution?
5. Write two grades of paper used in paper chromatography.
6. What is gel filtration?
7. Write types of electrophoresis.
8. Give two basic concepts of GLP.
9. Define group frequency region.
10. What is cell constant?

(LL 4270)

AUGUST 2017

Sub. Code: 4270

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Explain the principle of NMR. What are the conditions for nuclei to exhibit nuclear magnetic resonance?
b) Explain the terms chemically equivalent protons, shielding and deshielding, splitting of signals.
2. a) Explain the components of a Gas-Liquid Chromatography assembly and explain its working.
b) What are the different types of columns used in GLC? Explain.

II. Write notes on:

(8 x 5 = 40)

1. Describe the components of a Nephelometer.
2. What are the factors that affect fluorescence?
3. Describe the construction and working of a hollow cathode lamp.
4. Explain the construction and working of the standard calomel electrode.
5. Explain the principle of counter current extraction.
6. Explain 'Dead Stop End Point Titrations'.
7. Outline the basic concept of Total Quality Management.
8. Discuss how we may arrive at a formula to determine the number of vibrational degrees of freedom for a linear molecule and a non linear molecule.

III. Short answers on:

(10 x 2 = 20)

1. Name two solvents frequently used in Reverse phase HPLC.
2. Differentiate between Isocratic system and gradient elution system.
3. What are the conditions for the absorption of Infra-Red radiation?
4. What is molecular ion peak?
5. What is a Guard Column used in HPLC?
6. What is Gel filtration?
7. What is equivalent conductance?
8. What is half wave potential on a polarogram?
9. Give two applications of Turbidometric assays.
10. What is X-ray diffraction?

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

(LM 4270)

FEBRUARY 2018

Sub. Code: 4270

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Derive Beer-Lambert's law. Explain reasons for deviation from the law.
b) Draw, label and explain working of a double beam UV spectrophotometer.
2. Write on principle, electrodes, types of titrations and applications of a potentiometer.

II. Write notes on:

(8 x 5 = 40)

1. Explain quenching and its types.
2. Write on HPTLC.
3. Give principle and applications of gel chromatography.
4. Write theory of polarography with its application.
5. Narrate amperometric titration curves.
6. Explain flame emission spectroscopy.
7. Concepts of ISO 9000.
8. Validation of analytical procedures.

III. Short answers on:

(10 x 2 = 20)

1. Chemical shift.
2. Use of electrochemical cell.
3. R_f and R_x values.
4. Detectors of gas chromatography.
5. Polarographic Maxima.
6. Radio immunoassay.
7. Electrophoresis application.
8. Specific conductance.
9. Stationary phases of paper chromatography.
10. Detection in TLC.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

(LN 4270)

AUGUST 2018

Sub. Code: 4270

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Write in detail about the detectors used in Gas chromatography.
b) Write about the sampling techniques in IR spectroscopy.
2. a) Explain about the principle and instrumentation of Mass spectrometer.
b) Write about the applications of NMR.

II. Write notes on:

(8 x 5 = 40)

1. Write about the different types of detection techniques in paper chromatography.
2. Explain about the different types of vibration modes in IR.
3. Describe the construction and working of glass electrode.
4. DME in Polarography.
5. ELISA.
6. Ultra centrifugation.
7. Write in short about Gel Electrophoresis.
8. Explain the various parameters involved in the validation of analytical instruments.

III. Short answers on:

(10 x 2 = 20)

1. Define Chromophore and give examples.
2. Limiting current.
3. Define Dipole moment.
4. What is shielding?
5. Define the term phosphorescence.
6. Define Base peak.
7. What is conductivity?
8. Silicagel GF.
9. What is tailing and fronting peak in HPLC?
10. Write Nernst equation.

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. Write the procedure, types of currents and applications of polarography.
2. a) Write the principle, working procedure, advantages and applications of Radio Immuno Assay.
b) Draw and label a X-ray diffraction spectrophotometer and explain the working of each part of the instrument.

II. Write notes on:

(8 x 5 = 40)

1. Write a note on analyser used in mass spectroscopy.
2. How will you measure specific conductance? Explain with neat diagram.
3. Write the identification and quantification procedures involved in the separation of individual components from mixture by high performance liquid chromatography.
4. Write the mechanism involved in ion exchange chromatography.
5. Explain the different validation parameters of an analytical method.
6. What are different types of peaks in mass spectrum and write their significance in structural elucidation?
7. Write the working of any two HPLC detectors.
8. Write a note on detection techniques applied in Thin Layer Chromatography.

III. Short answers on:

(10 x 2 = 20)

1. Spin-spin coupling.
2. What is gradient elution technique?
3. Stationary phases used in gas liquid chromatography.
4. Define auxochrome.
5. Internal standards used in electron spin resonance spectroscopy.
6. Write the significance of salt bridge in reference electrode of potentiometry.
7. Write the precautions of conductometric titrations.
8. Applications of gel filtration chromatography.
9. Define fingerprint region and write its significance in Infra Red spectrum.
10. Difference between fluorescence and phosphorescence.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

(LP 4270)

AUGUST 2019

Sub. Code: 4270

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Write in detail about the principle and instrumentation of HPLC with a neat diagram.
b) Write about the various types of curves in conductometric titrations.
2. a) Explain about the principle and instrumentation of fluorimeter.
b) Explain the factors affecting the fluorescence intensity.

II. Write notes on:

(8 x 5 = 40)

1. Derive an equation for Beer-Lamberts Law.
2. Explain the reaction of amino acid with Ninhydrin reagent in paper chromatography.
3. Sources used in IR Spectroscopy.
4. What are the types of ion exchange resins used in Ion exchange chromatography?
5. Write a note on the preparation and activation of TLC plates.
6. Short note on coupling constant.
7. Write notes on GLP.
8. Potentiometric titrations.

III. Short answers on:

(10 x 2 = 20)

1. Explain Bathochromic shift and Hypsochromic shift.
2. Ilkovic equation.
3. Define quenching.
4. What is Junction potential?
5. Define the term retention time, retention volume.
6. Define Parent peak.
7. Define validation.
8. Give the range of IR. Spectrum.
9. What is edge effect?
10. Write different techniques in X-ray diffraction.

(LQ 4270)

FEBRUARY 2020

Sub. Code: 4270

**B.PHARM. DEGREE EXAMINATION
FOURTH YEAR
PAPER IV – MODERN METHODS OF PHARMACEUTICAL
ANALYSIS**

Q.P. Code: 564270

Time: Three hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 20 = 40)

1. a) Explain different types of electronic transitions.
b) Define Auxochrome and Chromophore with examples.
c) What is Frank codon principle explain?
d) Compare Double beam and Single beam spectrophotometer.
2. a) Outline the basic instrumentation of High Performance Liquid chromatography.
b) Define Relative Retention and Retention Index.
c) Describe different type of development techniques and methods used to locate the spots in paper chromatography.

II. Write notes on:

(8 x 5 = 40)

1. Write different mass analysers used in Mass Spectrometry.
2. Give Bragg's equation and explain.
3. Explain about Monochromator.
4. Explain the term Quenching.
5. Explain Shielding and de-shielding spin coupling in NMR spectroscopy.
6. Write note on ESR.
7. Write applications of mass spectroscopy.
8. Rheodyne.

III. Short answers on:

(10 x 2 = 20)

1. Define absorption maxima.
2. Define Base peak.
3. Expand ISO.
4. What is molecular ion peak?
5. Name different currents observed in Polarogram.
6. Define Fluorescence.
7. Define Limiting Current.
8. What is Chemical shift in NMR?
9. Define Beer Lamberts Law.
10. Define absorptivity.
