

[KH 268] SEPTEMBER 2002

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all branches)

Time : Three hours

Maximum : 100 marks

Use calculator as required.

Answer any FOUR questions.

All questions carry equal marks.

1. (a) Explain with illustrations the working of
double beam spectrophotometer. (15)

(b) Define molar absorptivity, Beer-Lambert's
law. (5)

(c) A solution containing 3.80 mg/100 ml of A
(MW = 220) has a transmittance of 39.8% in a 1.50 cm
cell at 500 nm. Calculate the molar absorptivity of A. (5)

2. (a) Explain the theory of nuclear magnetic resonance (NMR) spectroscopy and significance of Boltzman distribution. (10)

(b) Discuss with examples chemical shift and spin-spin coupling. (5 + 5)

(c) For the compound ethyl benzyl ether



discuss the following : number of NMR signals, their approximate positions and splitting of signals. (NMR refers only to proton magnetic resonance). (5)

3. (a) Elaborately explain the instrumentation of mass spectrometer. (10)

(b) Define and explain : (9)

Isotope abundance; Nitrogen rule and metastable ions.

(c) An analgesic and anti-inflammatory drug has a molecular formula $\text{C}_{11}\text{H}_{14}\text{O}_3$. It produces the following mass spectra. Apply fragmentation pattern rules, identify the compound after building the structure (6)

M/Z	Intensity	Fragment
206	63%	$\text{C}_{11}\text{H}_{14}\text{O}_3 (\text{M}^+)$
163	100%	$\text{C}_{10}\text{H}_{11}\text{O}_3$
119	73%	C_9H_{11}
91	82%	C_7H_7
2		[KH 268]

4. Explain the following techniques with examples :

(a) Radio immuno assay. (12½)

(b) Differential thermal analysis. (12½)

5. (a) Explain the principle involved in the production of X-ray diffraction patterns by deriving Bragg's equation. (12)

(b) Discuss the factors influencing the fluorescence intensity. (8)

(c) Explain how you will differentiate the IR spectra produced by ethers and alcohols. (5)

6. (a) Explain with neat illustration the instrumentation of HPLC. (12)

(b) Define the following : (6)

Gradient and isocratic elution, reverse and normal phase chromatography, capacity and selectivity factors.

(c) Explain how and why the following calibration techniques are adopted in GC/HPLC : (7)

Internal standard

Standard addition.

[KH 289] SEPTEMBER 2002

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. (a) Explain the principle behind IR spectroscopy.
What are the factors necessary in a molecule to absorb
IR radiation? (10)
- (b) What is the principle behind the working of
FT-IR spectrophotometer? Explain. (10)
- (c) Write a note on sample handling in IR
spectroscopy. (5)

2. (a) Explain the principle of Electron impact mass
spectrometry.

(b) Describe the various other techniques of
ionisation of samples for mass spectrometry. Bring out
their applications. (13 + 12)

3. Write notes on :

(a) Capillary electrophoresis

(b) X-ray crystallography

(c) Quantitative TLC. (9 + 8 + 8)

4. (a) Discuss in detail the principle and
instrumentation of HPLC.

(b) How are the following determined in HPLC?

(i) Column efficiency

(ii) Detector sensitivity.

(c) Discuss the working and applications of
detectors used in U.V. Spectroscopy. (11 + 6 + 8)

M.Pharm. DEGREE EXAMINATION

(New Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all branches)

Time : Three hours

Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

(a) Explain the fragmentation rules in mass spectroscopy. (13)

(b) Predict the fragmentation pattern for the following compounds, give reasons :

(i) 2, 2-dimethyl pentane

(ii) 1-Phenyl ethanol

(iii) 9, 10-anthra quinone. (12)

1. (a) Describe an analytical methods using microbiological assay for determinations of vitamin combinations. (15)

(b) Explain briefly NMR and its applications. (10)

3. (a) Explain the principle, applications in pharmacy, and instrumentation of UV/Visible spectroscopy. (13)

(b) Give an account of detectors used in gas chromatography. (12)

4. (a) What are the factors influencing vibrational frequencies? Explain with examples how IR spectra used for the identification of functional groups. (10)

(b) Describe the instrumentation and working of fluorimeter. Write a detailed note on quenching. (10)

(c) Write a note on quantitative IR spectrophotometry. (5)

5. (a) What is electrophoresis? Explain with example the method of paper electrophoresis, and instrumentation used for paper electrophoresis. (13)

(b) Write an account of cotton effects and circular dichroism. (12)

6. (a) What is polarography? Write the construction and working of a polarograph. (13)

(b) Explain the terms : (12)

(i) Halfwave potential

(ii) Residual current

(iii) Limiting current

(iv) Ilkovic equation.

APRIL 2003

[KI 289]

Sub. Code : 1001

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

All questions carry equal marks.

1. (a) What is the principle involved in thermo gravimetric analysis? Explain. List out its applications in pharmacy. (10)

(b) What is the principle and applications of supercritical fluid chromatography? (8)

(c) Write a note on Radio Immuno Assay and its application. (7)

2. (a) Write a short note on :

(i) Differential scanning calorimetry

(ii) Electron spin resonance spectroscopy.

(8 + 8)

(b) What are the requirements for a molecule to exhibit fluorescence? Explain. (9)

3. (a) Explain the instrumentation of NMR spectrometer. (10)

(b) Give an account of detectors used in gas chromatography. (15)

4. (a) What is the principle involved in flame emission spectroscopy? Discuss its instrumentation and application in pharmacy. (13)

(b) Give a brief account of

(i) Metastable peaks

(ii) Nitrogen rule

(iii) Mc-Lafferty rearrangement. ($3 \times 4 = 12$)

OCTOBER 2003

[KJ 268]

Sub. Code : 2001

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all branches)

Time : Three hours

Maximum : 100 marks

Calculators may be permitted.

Answer any FOUR questions.

1. (a) Write briefly the principle, instrumentation of
I.R. spectrophotometry. (12)

(b) List applications of capillary electrophoresis
and photon magnetic resonance spectroscopy. (8)

(c) A 8.44 PPM solution of FeSCN^{2+}
(mol int 113.9) has a transmittance, in a 1 cm cell at
580 nm, of 0.295. Calculate the molar absorptivity for
the complex at this wavelength. (5)

2. (a) Write briefly with appropriate illustrations, equations the principle of NMR spectroscopy. (12)

(b) Explain chemical shift and spin-spin coupling. (8)

(c) How do you explain the chemical shift data of the following compounds? (5)

(i) Benzene — C_6H_6 , $\delta = 7.37$

(ii) Acetylene — C_2H_2 , $\delta = 2.9$

(iii) Toluene — $C_6H_5CH_3$, $\delta = 2.32$

(iv) Cyclohexene — C_6H_{12} , $\delta = 5.57$.

3. (a) Describe the instrumentation and working of mass spectrometer. (12)

(b) Write notes on fluorescence and chemical structure. (8)

(c) The following data was obtained from mass spectra of a compound. Interpret and report the structure of the same

(i) molecular formula C_8H_8O

(ii) m/e ratios at 120, 105, 77, 51, 43 and 28.

(5)

4. (a) Explain with illustrations the instrumentation and working of HPLC. (12)

(b) Write notes on Radio immuno assay with pharmaceutical applications. (7)

(c) Define the following with equations : (6)

(i) Capacity factor

(ii) Resolution

(iii) Selectivity factor.

5. (a) Write a note on X-Ray generation and interpretation of X-Ray powder diffraction data. (13)

(b) Bragg's law and its applications. (12)

6. Explain the terms :

(a) Half wave potential. (6)

(b) Residual current. (6)

(c) Limiting current. (6)

(d) Ilkovic equation. (7)

OCTOBER 2003

[KJ 289]

Sub. Code : 1001

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

All questions carry equal marks.

1. (a) Explain Beer-Lambert law. Describe the working of a *u.v* visible spectro photometer. Enumerate the application of *u.v* in pharmacy. (7 + 7)
(b) Write a note on atomic absorption spectroscopy. (6)
(c) Write the principle of fluorimetry. (5)
2. (a) Describe the principle and working of flame emission spectroscopy and its application. (6 + 6)
(b) Write a note on capillary electrophoresis. (8)
(c) What is ion exchange chromatography? (5)

3. (a) Discuss in detail the principle behind mass spectroscopy. Explain how the different fragments formed help in interpretation of the spectra taking specific examples. (10)
(b) Explain the following terms : (8)
 - (i) Base peak
 - (ii) Metastable peak
 - (iii) Nitrogen rule.
- (c) Write a note on spin-spin coupling. (7)
4. (a) Discuss in detail the instrumentation of high pressure liquid chromatography. (10)
(b) Write a note on field desorption MS. (8)
(c) Explain chemical shift with specific examples. (7)

[KK 289] **APRIL 2004** **Sub. Code : 1001**

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours Maximum : 100 marks

Sec. A & B : Two hours and
forty minutes Sec. A & B : 80 marks

M.C.Q. : Twenty minutes M.C.Q. : 20 marks

Answer ALL questions.

All questions carry equal marks.

SECTION A — ($2 \times 15 = 30$ marks)

1. (A) Explain the principle of absorption spectra by molecules in UV-visible region. (10)
(B) Describe how an Infrared spectra is systematically interpreted. (5)
2. (A) Discuss the factors affecting chemical shift with suitable examples. (10)
(B) Write a note on C^{13} NMR spectroscopy. (5)

SECTION B — ($10 \times 5 = 50$ marks)

Short notes.

3. Write about Mc lafferty rearrangement.
4. Write a note on Programmed temperature gas chromatography.
5. Discuss the principle and applications of Differential Scanning Calorimetry.
6. Discuss the Woodward's rule and its applications.
7. Write about the important applications of X-ray diffraction methods.
8. Explain the different factors that affect the fluorescence intensity.
9. Discuss the principle and applications of ESR.
10. Discuss the factors responsible for the band broadening in a chromatographic column.
11. Write a note on super critical fluid chromatography.
12. Explain the principle and applications of Flame Emission Spectroscopy.

[KL 289] AUGUST 2004 Sub. Code : 1001

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours Maximum : 100 marks

Sec. A & B : Two hours and forty minutes Sec. A & B : 80 marks

M.C.Q. : Twenty minutes M.C.Q. : 20 marks

Answer ALL questions.

SECTION A

Long Essay : (2 × 15 = 30)

1. (a) State and derive Beer-Lambert's Law. What are its limitations? (8)

(b) Explain the principle and methodology of Differential scanning calorimetry. (7)

2. (a) With the help of a neat diagram explain the components of a Mass Spectrophotometer. (8)

(b) Write a short note on NOESY and COSY techniques. ($3\frac{1}{2} + 3\frac{1}{2} = 7$)

SECTION B

Short notes : (10 × 5 = 50)

3. Principle involved in Flame Photometry and its applications in pharmacy.

4. FAB analysis and applications.

5. Chemical shift and significance.

6. Capillary electrophoresis and applications.

7. Theory and applications of TGA.

8. Discuss two detectors of G.C.

9. Supercritical fluid chromatography.

10. Reverse phase HPLC technique and application.

11. EIMS — principle and application.

12. Fluorimetric analysis of Quinine sulphate and Thiamine.

FEBRUARY 2005

[KM 289]

Sub. Code : 1001

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

**Sec. A & B : Two hours and
forty minutes**

Sec. A & B : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

SECTION A — (2 × 15 = 30 marks)

Long Essay :

1. Write a note on chromophores and their interaction with electromagnetic radiation in U.V. region on the basis of Woodward's rule.
2. Give an account of detectors used in HPLC.

SECTION B — (10 × 5 = 50 marks)

Short notes on :

3. Significance of Ilkovic Equation and Halfwave potential.
4. Principle and applications of affinity chromatography.
5. Different types of conductometric titrations.
6. Qualitative IR spectrophotometry.
7. Instrumentation and working of fluorimeter.
8. Principle involved in the biological assay of Digitalis and Insulin.
9. Chemical shift.
10. Spin-spin splitting.
11. Coupling constant.
12. C^{13} NMR.

AUGUST 2005

(Revised Regulations)

Paper I — MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Theory : Two hours and forty minutes	Theory : 80 marks
---	--------------------------

Answer ALL questions.

1. (a) Explain the principles underlying the ionization patterns in the field desorption and fast atom bombardment mass spectrometry. (8)

(b) Describe the general rules of fragmentation in mass spectroscopy. (7)

2. (a) What do you mean by Nuclear Overhauser Effect (NOE)? What are its applications? (7)

(b) Emphasize on the derivatization methods and the principles involved in on-line derivatization process in HPLC and gas chromatography. (4 + 4)

1. How are X-rays generated? What are the applications of X-ray diffraction?

2. How do you distinguish between 2-pentanone and 3-pentanone on the basis of their mass and nmr spectra?

3. Describe stationary phases in HPLC and GLC.

4. Describe the structural features of molecules responsible for quenching effect in fluorimetry.

5. What is meant by capillary electrophoresis? Discuss the different modes by which the capillary electrophoresis techniques are carried out.

6. Describe the applications of atomic absorption spectroscopy.

7. Classify ion exchangers used in chromatography. Write their applications.

8. Describe the instrumental features of a classical HPTLC.

9. Write construction and working of Electron Capture Detector. (ECD).

10. Explain the principle and methodology of Thermogravimetric analysis.

[KO 289] MARCH 2006 Sub. Code : 1001

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours Maximum : 100 marks

Theory : Two hours and forty minutes Theory : 80 marks

M.C.Q. : Twenty minutes M.C.Q. : 20 marks

Answer ALL questions.

I. Long Essay : (2 × 15 = 30)

I. (a) Sketch a dispersive IR instrument and a Fourier Transform IR instrument. What is the difference between these instruments? (7)

(b) Give an account on the principle of mass spectroscopy. Select two compounds and comment on their fragmentation pattern. (8)

MARCH 2006

2. (a) Describe the principle and application of flame emission spectroscopy. (6)

(b) UV spectra arises from the absorption and emission by electronic transition. Explain this phenomenon with examples. (9)

II. Short notes : (10 × 5 = 50)

1. Describe the instrumental features and applications of LCMS.

2. Briefly explain the principle and instrumentation of capillary electrophoresis.

3. Explain the structural features affecting the fluorescent intensity. Why fluorimeter is more sensitive and selective than absorption spectra?

4. Explain how X-ray diffraction methods can be used for quantitative analysis.

5. What is derivative spectroscopy? Explain its application with one example.

6. Give an account of various techniques available for carrying out the thermal analysis. Give the working of any one instrument.

7. Describe the limitations and strengths of GLC.

8. How will you differentiate the following compounds by NMR and Mass spectroscopy?

(a) $\text{OH}-\text{CH}_2-\text{CH}_2-\text{OH}$

(b) $\text{CH}_3-\text{CH}(\text{OH})-\text{CH}_2-\text{OH}$.

9. Explain the construction and working principle of Time of Flight mass analyzer.

10. Discuss briefly the principle and instrumentation of HPTLC.

SEPTEMBER 2006

[KP 289]

Sub. Code : 2801

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Long Essay :

1. (a) Write the applications of thermogravimetric analysis, quoting suitable examples.

(b) Write a note on Radio immune assays.
(10 + 10 = 20)

2. Give a detailed account of principle, types of ion exchangers and chemistry involved with application of ion-exchange process in pharmaceutical analysis. Explain the factors that determine the distribution of ions between an ion-exchange resin and a solution. (15)

SEPTEMBER 2006

3. With reference to atomic, electronic and molecular factors, describe the theory underlying the following analytical techniques :

(a) Infra-red spectrometry

(b) NMR spectrometry

(c) Fluorimetry. (15)

II. Short notes : (6 × 5 = 30)

1. With a neat sketch, explain the working of a Barrier Layer Cell (BLC). Compare the sensitivity and application of BLC with the other detectors used in the detection of visible radiations.

2. Establish a mathematical relationship between concentration of fluorogenic substance and intensity of fluorescence. Give any two examples of a fluorogenic substance.

3. What is a base peak, M+1 peak, M+2 peak, parent ion peak and metastable ion peak in a mass spectrum? With the help of a suitable molecular structure show the formation of such peaks by fragmentation or such other process.

4. What are the different components of an atomic absorption spectrometer? What are their roles in the equipment?

5. What are bonded phase supports? List their advantages and applications in liquid chromatography.

6. What is chemical shift in NMR spectroscopy? Describe the various factors causing chemical shift with suitable examples.

Sub. Code : 2801

6. Principle and Pharmaceutical applications of DSC.

Sub. Code : 2851

(15)

6. How do you calculate the absorption maximum wavelength for Dienes with Woodward-fisher rules?

SEPTEMBER 2007

[KR 289]

Sub. Code : 2801

M.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

First Year

**Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES**

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Long Essay : (20)

1. (a) Why are the absorption bands in a UV spectrum very broad when compared to IR or NMR spectra? What are the factors that govern the position and intensity of the absorption bands in UV spectrum? Give the analytical applications of UV-visible spectrophotometry.

SEPTEMBER 2007

(b) Discuss the general appearance of IR spectrum of normal alkane. What are the changes in the above spectrum seen upon the introduction of following structural residues?

- (i) Alkene
- (ii) Alcohol-OH
- (iii) Carbonyl.

(2 × 15 = 30)

2. (a) Explain the theory of PMR Spectroscopy.

(b) What is Spin-spin splitting? Give the rules that characterise the spin-spin splitting of PMR resonance peak.

3. (a) Outline the instrumentation of mass spectrometry with special reference to different types of mass analyser.

(b) Write notes on :

- (i) Mc Lafferty rearrangement.
- (ii) Isotope effect in mass spectroscopy.

II. Short notes :

(6 × 5 = 30)

1. Explain the principle of ESR. How do you compare ESR with NMR method.

2. Explain the principle and significance of interferences involved in Flame emission spectroscopy.

3. What is Bragg's Law? Explain its significance.

4. Discuss the significance of Student's *T*-test, *F*-test and Chi-square in statistical analysis.

5. Write an account on Fundamental Principles of ORD.

6. Explain the significance of different types of ions formed in Mass Spectra.

SEPTEMBER 2007

[KR 315]

Sub. Code : 2851

M.Pharm. DEGREE EXAMINATION.

(Regulation 2006)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours

Maximum : 100 marks

Theory : Two hours and
forty minutes

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

1. (a) Explain diagrammatically the working of a spectrofluorimeter. (10)

(b) Discuss the theory of fluorescence and phosphorescence. (5)

(c) What are the applications of fluorimetry in quality control of drugs? (5)

2. (a) Describe different parts of a HPLC with a block diagram. (7)

(b) Explain the principles and applications of : (4 + 4 = 8)

(i) Super critical fluid chromatography.

(ii) Ion-exchange chromatography.

3. Discuss the following in detail : (3 × 5 = 15)

(a) Spin-spin coupling.

(b) Chemical shift.

(c) Proton exchange reaction.

II. Short notes : (6 × 5 = 30)

1. Write the applications of I.R. Spectroscopy in quality control of drugs and research.

2. Explain the principle of :

(a) Matrix assisted laser desorption.

(b) Fast atom bombardment ionisation.

3. Discuss the principle and applications of X-ray diffraction technique.

4. What is the principle involved in Radio immuno assay? What are its applications?

5. Explain the principle and applications of DTA.

6. What are the applications of AAS? Mention the advantages of AAS over Flame Photometry.

September 2008

[KT 315]

Sub. Code : 2851

M.Pharm. DEGREE EXAMINATION.

(Regulation 2006)

First Year

Paper I — MODERN PHARMACEUTICAL
ANALYTICAL TECHNIQUES

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

I. Long essay : (3 × 20 = 60)

1. (a) Explain different parts of a HPLC with block diagram.

(b) Discuss the working and applications of FT-IR spectroscopy.

2. (a) Explain diagrammatically the working of mass spectroscopy. Comment on fragmentation pattern of any two compounds.

(b) Discuss the principle and applications of NMR spectroscopy.

3. (a) Give an account on the principle of spectrofluorimeter.

(b) Discuss the working and applications of detectors used in Atomic absorption spectroscopy.

II. Short notes : (8 × 5 = 40)

(1) Explain the working principle of electron spin resonance spectroscopy. Mention the differences between ESR and NMR.

(2) Discuss the spin-spin coupling in detail.

(3) Explain the principle of differential scanning calorimetry.

(4) Discuss the principle and applications of super critical fluid chromatography.

(5) Explain the applications of NOESY and COSY.

(6) Discuss the working and applications of detectors used in Gas chromatography.

(7) Explain the interpretation of diffraction patterns and its applications.

(8) Discuss the principle and limitations of Electron Spin Resonance Spectroscopy.

March 2009

[KU 315]

Sub. Code: 2851

M.PHARM. DEGREE EXAMINATION

(Regulations 2006)

(For candidates admitted from 2006-2007 onwards)

FIRST YEAR

**Paper I – MODERN PHARMACEUTICAL ANALYTICAL
TECHNIQUES**

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer All questions

I. Essay Questions :

(3 x 20 = 60)

1. a) Explain Beer Lambert's Law and discuss about the deviations from Beer's Law.
b) Discuss about Various components of UV Spectrophotometer?
2. a) Explain the principle and instrument of a spectrofluorimeter with a neat diagram.
b) Explain the terms : Singlet, triplet state and quenching.
3. a) Enumerate the differences between FTIR and a dispersive IR instrument, draw neat labelled diagrams of a dispersive IR instrument and a FTIR.
b) Enumerate various pharmaceutical applications of NMR Spectroscopy.

II. Write Short Notes :

(8 x 5 = 40)

1. Write a brief note on Bragg's law.
2. Explain how HPLC is very useful in Bio pharmaceutical analysis.
3. Write the basic principles of Radio Immuno assay.
4. Discuss the advantages of HPTLC over TLC.
5. Explain the terms probability, normal distribution, regression, variance and degree of freedom.
6. Write differences between ESR and NMR .
7. Write a note on moving boundary electrophoresis.
8. Enumerate different types of detectors used in GLC-analysis.

September 2009

[KV 315]

Sub. Code: 2851

M.PHARM. DEGREE EXAMINATION

(Regulations 2006)

(For candidates admitted from 2006-2007 onwards)

FIRST YEAR

**Paper I – MODERN PHARMACEUTICAL ANALYTICAL
TECHNIQUES**

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer All questions

I. Essay Questions :

(3 x 20 = 60)

1. a) Explain in detail about the fragmentation rules in electron impact mass spectrometry. Give suitable examples?
b) Explain different analysers used in mass spectroscopy.
2. a) What are the basic requirements for absorption of IR radiation? Explain with suitable examples.
b) Write an account on chromophores with suitable examples. Discuss the choice of solvents and solvent effects in absorption.
3. a) Explain the principle and working procedure of the GLC with its limitations and strength.
b) What are the different detectors used in GLC?

II. Write Short Notes :

(8 x 5 = 40)

1. Discuss spin-spin coupling and factors affecting spin-spin coupling.
2. X-ray powder diffraction and its applications.
3. Students T test?
4. What is derivative spectra and write the applications of UV-spectra with suitable examples?
5. Affinity chromatography techniques and its applications.
6. Explain the factors affecting theoretical plate height based on van deemeter equation.
7. Circular dichroism and its applications.
8. Working principle of differential thermal analysis (DTA) and its applications.

March 2010

[KW 315]

Sub. Code: 2851

M.PHARM. DEGREE EXAMINATION

(Regulations 2006)

(For candidates admitted from 2006-2007 onwards)

FIRST YEAR

**Paper I – MODERN PHARMACEUTICAL ANALYTICAL
TECHNIQUES**

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer All questions

I. Essay Questions :

(3 x 20 = 60)

1. a) Discuss the important principles and instrumentation of nuclear magnetic resonance spectroscopy.
- b) Explain the techniques of decoupling interaction between ¹³C-NMR and ¹H-NMR (Nuclear magnetic resonance) spectroscopy.
2. Enumerate the detectors used in the UV – spectroscopy, IR – spectroscopy and HPLC (High Performance Liquid Chromatography) techniques. Explain any one with neat diagram.
3. a) Explain the principle and methodology of differential scanning calorimetry.
- b) Discuss the working principle and applications of HPTLC (High Performance Thin Layer Chromatography) technique with instrumentation.

II. Write Short Notes :

(8 x 5 = 40)

1. Discuss the wood-ward's rule and its applications.
2. Explain the working principle and applications of fast atom bombardment mass spectroscopy.
3. Write a note on flame emission spectroscopy and its applications.
4. Explain the principle of flurometry with one suitable example and its applications.
5. Write a brief note on electron spin resonance spectroscopy and its limitations.
6. Write a brief note on LC-MS.
7. Write the principle and applications of Radio immuno assay.
8. Students – T- test.

September 2010

[KX 315]

Sub. Code: 851

M.PHARM. DEGREE EXAMINATION

(Regulations 2006)

(For candidates admitted from 2006-2007 onwards)

FIRST YEAR

Paper I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer All questions

I. Essay Questions :

(3 x 20 = 60)

1. a) Explain in detail the rules for interpreting High Resolution PMR spectra with suitable examples.
b) What is Cotton effect and Circular dichroism? Write their applications.
2. a) Write the working principle of Thermo gravimetric analysis.
b) Describe types of ion exchangers and their applications in chromatography?
3. a) Outline the differences between HPTLC and TLC.
b) Explain the importance of student T-test in statistical analysis of significant data.

II. Write Short Notes :

(8 x 5 = 40)

1. Anisotropic effect and inductive effect in determining chemical shift with examples.
2. Principle of chemical ionization in mass fragmentation process and its advantages over electron impact ionization.
3. Decoupling methods in C-13 NMR spectroscopy.
4. Instrumentation of Spectrofluorimetry.
5. Application of Flame emission and Atomic absorption spectrometry.
6. Impact of auxochromes in causing types of shift in UV-spectra with relevant examples and diagrams.
7. Interpretation of organic molecules through vibrational frequency spectra.
8. High performance Liquid Chromatograph – construction and working.

MAY 2011

[KY 315]

Sub. Code: 2851

M.PHARM. DEGREE EXAMINATION

(Regulations 2006)

(For candidates admitted from 2006-2007 onwards)

FIRST YEAR

Paper I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all Branches)

Q.P. Code : 262851

Time : Three hours

Maximum : 100 marks

Answer All questions

I. Essay Questions:

(3 x 20 = 60)

1. a) Outline the principle behind NMR spectroscopy. Elaborate on factors which influence chemical shift
b) Comment on general fragmentation mode observed in mass spectroscopy.
2. a) Comment on IR spectra of a) amino acids b) aldehydes c) alcohols d) acids.
b) Explain briefly about the instrumentation of gas chromatography with a neat diagram.
3. a) Give the significance of students T test, Anova, regression analysis and correlation coefficient. (10)
b) Explain how X-rays are generated. (10)

II. Write Short Notes

(8 x 5 = 40)

1. Give the principle and working of flame emission spectrophotometer.
2. Define a) Column dead time
b) Capacity factor
c) Retention time
3. How will you differentiate the following pair of components by NMR spectroscopy
a) dibromoethane b) 1,2-dibromopropane
4. Discuss briefly about ESR and its application.
5. Write the principle and application of fluorimetry.
6. Give the construction and working principle of Time of Flight Mass analyser.
7. Compare the principle and working of Differential scanning calorimetry and Differential thermal analysis.
8. How will you distinguish between the following pair of compounds in IR spectra
a) Butanol and butanone
b) Ethanol and ether
