MARCH 1989

M.Pharm. DEGREE EXAMINATION, MARCH 1989

MODERN ANALYTICAL TECHNIQUES IN THE QUALITY CONTROL OF DRUGS AND PHARMACEUTICALS

(Common to All Branches)

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. What are O.R.D. curves ? Discuss the theory, technique and instrumentation. List the advantages offered by O.R.D. (25 marks)

2. (*a*) What information do you get from N.M.R. spectra ? Write a note on the important parts of N.M.R. spectrometer. (18 marks)

(*b*) Write a brief note on radioactive tracers. (7 marks)

3. Write notes on any *two* of the following :

(*a*) Column efficiency in G.L.C.

(*b*) Polarographic technique in quantitative and qualitative analysis.

(*c*) X-ray diffraction analysis. (2×12½=25 marks)

4. Discuss the principle of mass spectrometry and working of one such instrument. Explain its role in structure elucidation of organic compounds. (25 marks)

5. Describe any *two* :

(*a*) Theory and application of H.P.L.C.

(*b*) Complexometric titrations.

(*c*) Methods of minimising errors in pharmaceutical analysis. (2×12½=25 marks)

SEPTEMBER 1991

FIRST M.Pharm. DEGREE EXAMINATION, SEPTEMBER 1991.

(Common to Specialisations A, B, C and D)

Paper I — MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Time : Three hours. Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. Discuss briefly different types of liquid chromatographic techniques, indicating the principles underlying.

Explain the following terms with examples and applications :

(a) Guard column.

(b) Bonded phase.

(c) Gradient elution.

(d) Internal standard.

2. Discuss briefly with suitable examples, fragmentation processes that occur in electron-impact Mass spectrometry. What is chemical ionisation MS and how does it find applications ? What is understood by isotope substitution in MS and what are its applications ?

SEPTEMBER 1991

3. What is the basis of UV and visual spectra of organic compounds ? Discuss different methods available for quantitative analysis of mixtures of drugs by UV spectrophotometry Explain with examples :

(a) Bathochromic shift.

(b) Hypsochromic shift.

(c) Solvent correction and

(d) Charge transfer spectra.

4. Why are infra-red spectra also known as "molecular spectra" ? Explain the following, with reference to infra-red spectrophotometry :

(a) Michelson interferometer.

(b) Attenuated total reflection

(c) Near infra-red region spectrophotometry and

(d) Quantitative infra-red spectrophotometry.

5. With the help of a neat diagrammatic sketch of a typical high resolution PMR spectrum of pure iso-propanol, explain what all information can be reliably deduced from the spectrum. If the methine proton of isopropanol is selectively irradiated with strong RF signal, what will be the resulting PMR spectrum ? What will be the effect of addition of a small amount of (a) D_2O and (b) HCl on the PMR spectrum of isopropanol ?

6. How are radio-nuclides produced ? Enumerate some commonly employed compounds containing radio-nuclides and their specific applications in research.

Explain the technique of isotope dilution analysis. Outline briefly the principles of radio-immune assays and their applications.

7. Write briefly on the following :

(a) Nuclear Overhauser Enhancement.

(b) Circular Dichroism.

(c) Capillary Coloumns in GC.

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[P 97]

MARCH 1992

FIRST M. Pharm. DEGREE EXAMINATION, MARCH 1992.

First Year

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours. Maximum : 100 marks.

Answer any FOUR questions.

All questions carry equal marks.

1. Give an account of Radioactive compounds used for isotopic dilution analysis and its application in medicine. Discuss the advantages and limitation of these methods.

2. Explain with a suitable example how ultra violet, infrared, NMR and Mass spectra of a compound help in elucidating its structure.

3. Elaborate on any *two* :

(*a*) Molecular Sieving analysis.

(*b*) Principle of Amperometric titration and its application.

(*c*) X-ray diffraction analysis and its application.

4. Explain the working principle of Mass spectrometer and high resolution Mass spectrometer. What are the applications of Mass spectrometry ?

5. Explain the operational detail of a proton magnetic resonance spectrometer. Explain the D_2O exchange technique in locating hydroxyl group of compounds.

6. Elaborate on any *two* :

(*a*) Isoabsorption spectrophotometric determination of its application.

(*b*) Preparative thin layer chromatography and its application.

(*c*) Instrumentation and application of electron spin resonance.

(*d*) Principle of fluorimetric estimation.

[PR 451] **NOVEMBER 1993**

M.PHARM DEGREE EXAMINATION

First Year

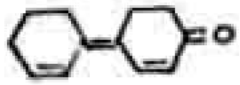
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours. Maximum : 100 marks

Answer any FOUR questions.
All questions carry equal marks.

1 (a) Give an account of empirical correlations of structure and electronic spectra, with suitable examples. Predict the most probable absorption maximum of the compound shown below with justification : (10+3)



(b) Explain principles underlying quantitative analysis using fluorescence property of some compounds. With a neat diagram explain the instrumental aspects of fluorimetry. (12)

2. (a) Explain briefly principles underlying successful application of HPLC. Indicate the specific applications of the more important types of columns and detectors used in HPLC. (15)

(b) Discuss briefly principles and applications of polarography in drug analysis. (10)

3. (a) With the help of a diagram explain in detail the working of a single focusing 180° sector mass spectrometer. (13)

(b) Explain the following terms with reference to mass spectrometry : Resolution of a mass sepectrometer ; Nitrogen rule ; Selected ion monitoring ; Isotope abundance. (12)

4. (a) What factors affect migration rate of ions during electrophoresis ? How are these factors optimized to achieve best separation of charged species in a mixture ? (13)

(b) Explain briefly the following related processes : High voltage electrophoresis ; Disc electrophoresis ; Isoelectric focussing. (12)

5. (a) Discuss the phenomenon of homonuclear and heteronuclear spin coupling and their effects on the appearance of signals in a typical NMR spectrum. What is J value and how is it calculated and made use of, in NMR spectroscopic analysis ? (19)

(b) In an NMR spectrum an indecipherable multiplet was noted at delta 1.5. On constant irradiation at a frequency of corresponding to delta 0.9 and recording the spectrum again, the signal at delta 1.5 resolved itself into 1 : 2 : 1 triplet. Explain these observations and your conclusions. (6)

6. (a) Explain with suitable diagrams following terms ; Plain ORD curves ; Abnormal ORD curves ; Negative and Positive Cotton effect curves : Multiple Cotton effect curves ; Amplitude and breadth of a cotton effect curve. What is the significance and application of each of these ? (15)

(b) Explain briefly the principle and application of radio-immune assay technique. (10)

[ND 274] NOVEMBER 1994

M. PHARM. DEGREE EXAMINATION

FIRST YEAR

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all Branches)

Time : Three hours Maximum : 100 marks

Answer Any FOUR Questions

All Questions carry equal marks.

1. Explain the following :
   (a) Chemical shift
   (b). Frequency swept and field swept NMR
   (c) Spin coupling and spin decoupling
2. (a) Explain briefly principles underlying successful application of HPLC. Indicate the specific applications of the more important types of columns and detectors used in HPLC.
   (b) Discuss briefly principles and applications of polarography in drug analysis.
3. (a) Describe briefly different techniques of preparing samples for infra-red spectroscopy. How do the spectra obtained by these techniques differ ? What are the specific advantages or drawbacks associated with these ?
   (b) Explain briefly the principle and application of radio-immune assay technique.
4. (a) Discuss the ionisation sources used in a mass spectrophotometer.
   (b) Discuss briefly :
      1. Thermo mechanical analysis
      2. Pharmaceutical applications of thermal analysis.
5. (a) What factors affect migration rate of ions during electrophoresis? How are these factors optimized to achieve best separation of charges species in a mixture?
   (b) Explain briefly the following related processes
      1. High voltage electrophoresis
      2. Disc electrophoresis
      3 Iso electric focussing
6. Explain the principle and the method involed in the assay of the following
   (a) Digitalis IP
   (b) Vitamin B_{12} IP
   (c) Tetracycline IP

APRIL 1995

SB 291

M.PHARM DEGREE EXAMINATION

First Year

(Old Regulations)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

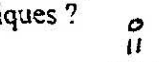
Time : Three Hours Maximum Marks : 100

Answer any Four Questions

All Questions carry equal marks

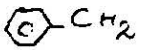
I. a)What are the characteristic bonds for COOH group in the I.R.Spectrum? Show how these can be distinguished from enols aldehydes ketones and esters by I.R.Spectroscopy.

b)How can the following functional groups present in organic compounds be detected by means of spectroscopic techniques ?

i) 

ii) 

iii) 

iv) 

c)How do you distinguish the following pairs of compounds by Mass spectra ?

i) 

ii) 

II. a)Discuss the principle and instumentation of N.M.R. Spectrometry.

b)Explain the difference between PMR and ^{13}C-NMR.

c)Write the significance of NOE and high frequency RF in ^{13}C NMR spectrum.

III. a)Discuss the principle of mass spectrometer.

b)Explain the following :

i)Chemical Ionization and field ionisation

ii)Nitrogen rule

iii)Metastable ions

IV .a) Discuss the theory behind the paper , thin layer and Ion exchange chromatography.Describe their limitations and advantages.

b) Explain the various types of columns and detectors used in High pressure liquid chromatography.

V. Explian the principles and methods involved in the assay of :

i)Nalidixic acid I.P

ii)Mestranol I.P.

iii)Digitoxin I.P.

VI Write short notes on :

i)Isotopic dilution analysis.

ii)Applications of turbidimetry and nepulometry.

iii)X-Ray diffraction analysis.

APRIL 1995

SB 303

M.PHARM DEGREE EXAMINATION

First Year

(New Regulations)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

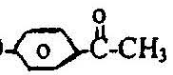
(Common to all Branches)

Time: Three hours Maximum: 100 marks.

Answer any **Four** questions.
All Questions carry equal marks.

I. a). Predict the approximate chemical shifts and signal multiplicities for the following in 1HNMR spectrum.

i). $CH_3 - CH_2 O - \overset{O}{\overset{\|}{C}} - CH_3$

ii) 

b). What are the approximate chemical shifts of carbons in the 1H decoupled 13C - NMR spectrum of

i). $CH_2 = CH - COOH$

ii). $OH - CH_2 - CH_2 - C \equiv N$

c). Identify which one of the following the isomeric ketones will exhibit the U.V. maximum at 240 um (E 18,000) Give reasons for identification.

d). How do you distinguish the following pairs of compounds resing I.R. spectroscopy

i). $CH_3 CO CH_2 CH_3$

ii). $CH_3 CH_2 OCH_2 CH_3$

II. a). Discuss the working principle of mass spectrometer.

b). Discuss the use of mass spectrometry for quantitalive analysis of mixture of compounds.

III. a). Discuss the principle and instrumentation of flame photometry.

b). Explain the sources of errors and applications of flame photometry.

IV. Explain the principle and methods involved in the assay of

i). Riboflavin I.P.
ii). Ampicillin I.P.
iii). Diazepam I.P.

V. Discuss the principles, intrumentation and applications of HPLC.

VI. Write notes on:

a). Different thermal analysis
b). Applications of conductometric titrations in pharmaceutical ~~anerpis.~~ analysis
C). ORD and octant rule.

[AK 304]

APRIL 1996

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

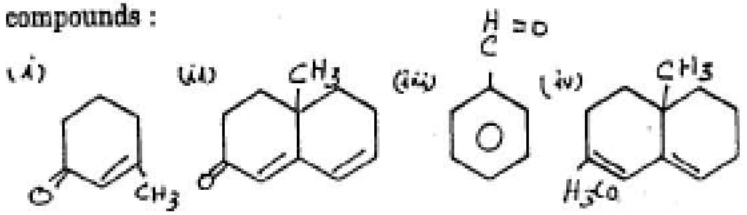
(Common to all Branches)

Time : Three hours Maximum : 100 marks

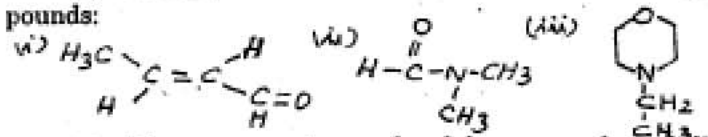
Answer any FOUR questions.

All questions carry equal marks.

1. (a) Predict the U.V. and I.R. absorptions of tne following compounds :



(b) Predict the NMR resonance of the following compounds:



(c) The mass spectrum of cyclohexanone showed distinctive peaks at m/z 98, 83, 55 and 42. Deduce the fragmentation pattern.

2. (a) Explain the techniques used in the preparation of samples for I.R. spectroscopy and discuss their limitations and advantages.

(b) Explain the following :

(i) Gradient elution in HPLC.

(ii) Chemical ionization and field ionization in mass spectrometry.

3. (a) Describe the principle and instrumentation of O.R.D.

(b) Explain the various types of columns and detectors used in H.P.L.C.

(c) Write on the applications of potentiometry in pharmaceutical analysis.

4. (a) Explain the principle involved and the instrumentation of double beam spectrophotometer.

(b) Discuss the different methods available for quantitative analysis of single component and two component samples using U.V. spectrophotometry.

5. Explain the principle and the method involved in the assay of :

(a) Atropine sulphate I.P.

(b) Phenformin Hydrochloride I.P.

(c) Oestradiol benzoate I.P.

6. Write notes on :

(a) Radio immuno assays.

(b) Paper electrophoresis.

(c) Pharmaceutical applications of polarography.

(PK 200) OCTOBER 1996

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

Time: Three hours Maximum: 100 marks

Answer any FOUR questions.

All questions carry equal marks.

I. a. Give the theoretical principle involved in Mass spectrometry with the aid of a diagram of a single focussing mass spectrometer. (10)

b. Give the important aspects of molecular fragmentation on electron impact. (15)

II. What is a chemical shift? Give the factors influencing chemical shift. (5+20)

III.a. What are the fundamental requirements to perform quantitative determinations in U-V visible spectroscopy. (10)

b. Give two methods that may be adopted to determine the concentration of 2 drugs in a sample, each of which absorbs at the max of the other?

IV.a. What are the factors that determine the accuracy and precision of gas chromatographic analysis. (15)

b. How is (i) the efficiency of a column determined in Gas Chromatography

(ii) the optimum flow rate of carrier gas determined. (5+5)

APRIL 1997

MP 252

M.Pharm. DEGREE EXAMINATION

(New Regulations)

First Year

Paper I - MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

Time: Three hours Max. marks: 100

Answer any FOUR questions

All questions carry equal marks.

I. (a) Describe the working of a U.V.Spectrophotometer with the help of a neat diagram. (15)

(b) Explain the effect of solvent and slit width on U.V.Spectra. (10)

II. (a) Describe the principles and techniques involved in Column chromatography. (15)

(b) What are the methods employed for the detection of compounds in Thin Layer Chromatography? (10)

III. (a) Give the principle of working and a schematic representation of an X-ray diffractometer. (15)

(b) Give some applications of X-ray diffraction analysis. (10)

IV. (a) Describe the basis and techniques of flame emission spectroscopy.

(b) What are its applications in Pharmacy? (10)

(a) Explain the factors involved in polarography. (10)

(b) Describe the instrument and techniques used in polarography and its application in analysis. (15)

I. Write briefly on:

(a) Interpretation of NMR spectra

(b) Electron spin resonance

(c) Reversed phase chromatography

(d) Potentiometric titrations

(e) Radiation detectors used in I.R. Spectrophotometers.

(5x5=25)

OCTOBER 1997

M.Pharm DEGREE EXAMINATION

MS 236 (New Regulations)

First Year

Paper I - MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

Time: Three hours Max. marks:100

Answer any FOUR questions

All questions carry equal marks

I. (a) Describe the working of an Infra red spectrophotometer with the help of a neat diagram. (10)

(b) Explain the importance of I.R.spectra in the elucidation of the structure of an organic compound. (15)

II. (a) What are the principles involved in atomic absorption spectroscopy? How does it differ from flame emission spectroscopy? (10+5)

(b) Give the applications of AA spectroscopy in Pharmaceutical Analysis. (10)

III. (a) Explain Beer-Lambert's law. What are the limitations of the law? (5+5)

(b) Describe the applications of U.V. absorption spectroscopy in pharmacy. (15)

IV. (a) What is fluorescence? How is it related to chemical structure? (5+5)

(b) Explain the factors affecting fluorescence intensity. (15)

V. (a) Describe the principles and techniques involved in Paper Chromatography. (15)

(b) Compare Paper Chromatography with Thin Layer Chromatography. (10)

VI. Write briefly on:

(a) Differential Thermal analysis

(b) Interpretation of Mass Spectra

(c) Conductometric titrations

(d) Reference electrodes

(e) Spin-spin coupling.

(5x5=25)

[SV 268] **APRIL 1998**

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Paper 1 — MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. a) What are the modes of vibration of atoms in Poly Atomic molecules? Illustrate their types. (15)

(b) Briefly discuss the I.R. spectra of aldehydes, ketones carboxylic acids and amino acids. (10)

2. (a) Describe the various components of a high-resolution NMR spectrometer. (15)

(b) Write a note on reference compounds used in NMR spectroscopy (4)

(c) Predict the signal positions (δ- values) in the NMR spectra of (i) benzyl alcohol (CCl_4) and (ii) ethyl bromide ($CDCl_3$). (6)

3. (a) What is the principle of Atomic absorption spectroscopy? How does it differ from flame emission spectroscopy ? (10)

(b) Draw a schematic diagram and explain the working of an atomic absorption spectrophotometer. (15)

4. What are the different X-ray methods available for Chemical analysis? Write their applications. Write about the two types of detectors used in X-ray spectroscopy. (10+10+5)

5. What is the principle of Polarographic method of analysis? Describe the apparatus and electrical circuit in the construction of a polarograph. Give some of its applications in Pharmaceutical analysis. (8+12+5)

6. Write brief notes on : (5 × 5 = 25)

(a) Applications of U.V. spectroscopy

(b) Types of ions produced in a mass spectrometer.

(c) Presentation of ESR spectra.

(d) Paper chromatographic separation of carbohydrates

(e) Principle of ion exchange chromatography.

[KA 268] **OCTOBER 1999**

M.Pharm. DEGREE EXAMINATION.

First Year

(New Regulations)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

Please be brief and to the point.

All questions carry equal marks.

Each subdivision of a question carries 5 marks.

1. (a) A mixture of three substances *A*, *B* and *C* are eluted at 2 min. 40 seconds, 3 min. 20 seconds and 3 min. 55 seconds respectively in a gas chromatograph. If *A* is not retained by the column, answer the following.

(i) What is column dead time?

(ii) What is the adjusted retention time of *B*?

(iii) What is the separation factor of *B* and *C*?

(iv) What is the capacity factor of *C*?

(v) What is the adjusted retention time of *C*?

(b) Compare highlighting the chief differences between HPTLC and TLC.

(c) Explain the mechanism of separation in ion exchange chromatography with the help of an example.

(d) Explain the purpose of using an internal standard. How is an internal standard chosen? What are the advantages of using an internal standard in chromatography?

(e) What is gradient elution in HPLC? How is it carried out?

2. (a) Explain the differences in construction and working of a single beam and double beam spectrophotometers with the help of a diagram.

(b) Why is fluorimetry more sensitive and selective than spectrophotometry? Why is it more difficult to estimate absorbance of very dilute and very concentrated solutions?

(c) What are the factors that lead to deviations from Beer's Law? How do they affect the measurement of absorbance?

(d) How will you differentiate, on the basis of Infra Red Spectra, the following functional groups?

(i) Phenolic OH and alcoholic OH

(ii) Mono, di and tri substituted benzenes

(iii) Nitro group and Amino group.

(e) Why are special sampling techniques necessary in infrared spectroscopy? How are solids samples prepared for Infra Red Spectroscopy?

3. (a) Draw a sketch of a flame photometer and explain its working. What are the elements commonly detected by this technique?

(b) With the help of a labelled diagram, explain he working of dropping mercury electrode. What are the factors that favour the choice of mercury as a microelectrode?

(c) Define the term supporting electrolyte. What is the role of supporting electrolyte in polarography? Why is the solution purged with nitrogen during polarography?

(d) Describe amperometry with the help of an example. How do you apply amperometric titration for analysing a mixture of metallic ions? Explain with the help of an example.

(e) With the help of a diagram, explain X-ray diffraction technique in analysis. What is the main information that you get from X-ray diffraction studies?

4. (a) Explain *shielding* and *deshielding* in Nuclear Magnetic Resonance spectroscopy with examples.

(b) Explain chemical shift in NMR spectroscopy. Illustrate with the help of example if necessary.

(c) Explain the reason for the splitting of NMR peaks. Explain with the help of examples.

(d) What are salt bridges? What is the function of a salt bridge? How is it constructed?

(e) Discuss the three stages in the conductimetric titration of a mixture of a weak acid and strong acid with a strong base. Explain the reasons for the steep fall in conductance followed by the gentle rise and finally the steep increase.

5. (a) Explain the principle and the working of a Fluorimeter with the help of a labelled sketch.

(b) Explain the functions of various parts of a mass spectrometer with the help of a diagram.

(c) Explain McLafferty rearrangement.

(d) What is the information obtained from a mass spectrum? Explain with the help of an example of your choice.

(e) Explain the principle of amperometric titrations. What type of compounds are analysed by this method?

6. (a) What are the advantages and disadvantages of biological methods of analysis? Explain the application of any one to illustrate your point.

(b) Critically compare electron impact and chemical ionisation Mass spectra.

(c) Explain the principle of a Differential Scanning Calorimetry.

(d) What is the percent transmittance of a solution which has an absorbance of 0.764 at a wavelength of 450 nm? What will be the molar absorptivity of the chromophore in the above solution if the molecular wt is 245 and the concentration is 0.001 g/liter.

(e) What is the information you obtain from Ilkovic Equation? What are the applications of this equation in polarography?

[KB 268] **APRIL 2000**

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Paper I — MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

(Common to all branches)

Time : Three hours Maximum : 100 marks

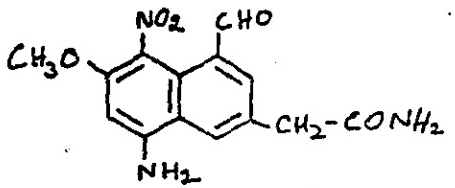
Answer any FOUR questions.

All questions carry equal marks.

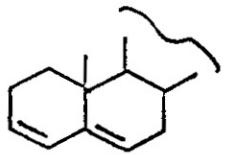
1. (a) With a neat diagram explain the working of different parts of a double beam spectrofluorimeter. (10)

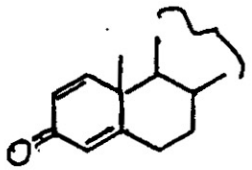
(b) Explain the pharmaceutical applications of spectrofluorimetry. (5)

(c) Giving reasons, suggest any two methods to estimate the undermentioned hypothetical compound. (5)



(d) Applying Woodward–Fieser rules, calculate absorption maximum of the following compounds. (5)

(i) 

(ii) 

2. (a) Explain the principle behind different detectors used in I.R. spectrophotometer. (10)

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

(c) What steps have to be taken by a quality control chemist, if the I.R. spectrum of a sample does not coincide with that of reference substance and why? (5)

(d) How will you differentiate the following pair of compounds by N.M.R. spectroscopy? (5)

(i) $CH_2(OH)-CH_2(OH)$ (ii) $CH_3-CH(OH)-CH_2(OH)$

3. (a) Explain essential features of a gas–chromatograph with a neat sketch. (10)

(b) What are the recent developments in the resolution of chiral compounds by HPLC? (5)

(c) Write the principle, methodology and estimation of potency of antibiotics by turbidimetric method of microbiological assay. (10)

4. Give a detailed account of (a) principle (b) instrumentation and (c) applications of thermogravimetry. (5 + 10 + 10 = 25)

5. (a) Explain chemical ionisation mass spectrometry and field ionisation mass spectrometry. (15)

(b) Given below is the proposed structure for an organic compound which shows m/z peaks at 46, 45, 31 and 29. Confirm the structure by describing different fragmentation modes. (5)

$$CH_3 - CH_2 - OH.$$

(c) What is theoretical plate? How is it calculated? What is its significance? (3 + 1 + 1 = 5)

6. Write explanatory notes on : (7 + 6 + 6 + 6 = 25)

(a) Estimation of a mixture of weak and strong acids by conductometry (with graph)

(b) Ion exchange chromatography

(c) Flame emission spectrophotometry

(d) Spin–spin coupling and spin–decoupling.

[KC 268] OCTOBER 2000

FIRST M.Pharm. DEGREE EXAMINATION.

First Year

(New Regulations)

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.

1. (a) Explain the theory of UV–visible spectrophotometry including the concepts of energy level, transition types, chromophores and the laws of absorption spectroscopy with their limitations. (18)

(b) Write notes on the application of UV–spectrophotometry for the quantitative analysis of multicomponent mixture. (7)

2. (a) Write an essay on the radiation source, monochromator and detector used in Infra Red spectrophotometer. (13)

(b) What is the principle of Atomic Absorption Spectrophotometry? How does it differ from flame photometry? Mention the merits and demerits of Atomic Absorption technique over flame photometry. (12)

3. (a) Give a detailed account on chemical shift and spin–spin coupling and their use in NMR spectral interpretation. (12)

(b) Explain the principle and application of Radio Immuno Assay. (13)

4. (a) Write the theory, principle and Instrumentation of magnetic deflection mass spectrometer and write notes on double focus mass spectrometer. (17)

(b) Explain the following :

(i) Chemical Ionisation and its use.

(ii) Field Ionisation. (8)

5. (a) Explain the structural features and Physico–Chemical factors affecting fluorescent intensity. Why fluorimetry is more sensitive and selective than absorption spectrophotometry? (13)

(b) Explain the principle and applications of differential scanning calorimetry. How does it differs from Differential Thermal Analysis? (12)

6. (a) Give an account on Ion selective electrodes. (8)

(b) Explain, in detail, the concept of theoritical plates and the relation between the number of theoritical plates and flow rate of mobile phase in Gas Chromatography. (6)

(c) Explain the molecular anisotropy and its effect on NMR signal. (6)

(d) Explain the use of Isotope abundance in the interpretation of mass spectra. (5)
