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

[LL 931] NOVEMBER 2017 **Sub. Code: 2931**

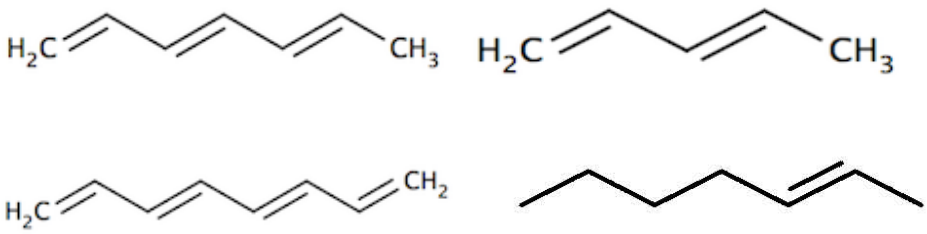
M.PHARM. DEGREE EXAMINATION
(PCI New regulations 2016)
SEMESTER-I
PHARMACEUTICS – MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Describe the theory and factors affecting the measurement of fluorescence.
   b) With a neat diagram describe the instrumentation and applications of Spectrofluorimeter.
2. a) i) Which of the following molecules would absorb the longest wavelength and why?



   ii) How many number of vibrational modes possible for carbon dioxide molecule?
   b) Discuss Bragg's law, types of crystals and applications of X-ray diffraction.

II. Write notes on: **(7 x 5 = 35)**

1. State and explain Beer-Lambert Law. Write briefly about the deviations of the absorption laws.
2. Write short notes on chemical shift.
3. With a neat diagram explain the construction and working of Hollow cathode lamp and Photomultiplier tube.
4. Explain the fundamental vibrations of the molecules in IR spectrophotometry.
5. Discuss McLafferty rearrangement and its significance in structural diagnosis.
6. Write a note on detectors used in HPLC.
7. Discuss the principle and applications of Bioluminescence assays.

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

[LM 931] MAY 2018 **Sub. Code: 2931**

M.PHARM. DEGREE EXAMINATION
(PCI New regulations 2016)
SEMESTER-I
PHARMACEUTICS – MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

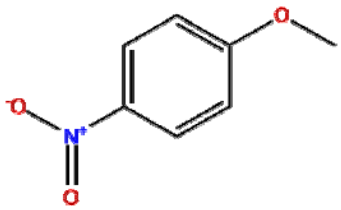
Q.P. Code : 262931

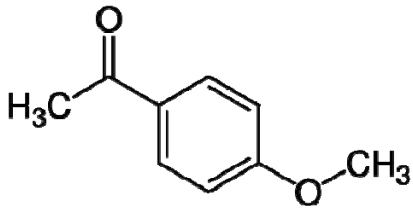
Time : Three hours **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) With a neat labeled diagram, explain the construction and working of double beam UV-Vis Spectrophotometer.
   b) Describe the principle and any two types of ionization methods of mass spectroscopy.

2. a) Explain the principle and instrumentation of Nuclear magnetic spectroscopy.
   b) i) Predict the approximate chemical shift positions for the protons of the following structures.





ii) Draw the possible structure for the compound (molecular formula C_3H_7Cl) that shows one doublet and one septet in proton NMR spectrum.

II. Write notes on: **(7 x 5 = 35)**

1. Write a note on ^{13}C-NMR and coupling constant.
2. Explain the application and various interferences occurring in Flame emission spectroscopy.
3. Classify Ion exchange, Ion exchangers used in Ion exchange chromatography. Enumerate the mechanism and factors affecting Ion exchange process.
4. Explain the sample handling techniques used in IR spectra.
5. Discuss the principle and factors affecting separation of paper electrophoresis.
6. Describe the theory of fluorescence with Jablonski diagram.
7. Write short notes on ELISA.

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

[LN 931] NOVEMBER 2018 **Sub. Code: 2931**

M.PHARM. DEGREE EXAMINATION
(PCI New regulations 2016)
SEMESTER-I
PHARMACEUTICS – MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) With a neat diagram, explain the principle and instrumentation of GLC.
   b) Describe the principle and instrumentation of double beam Infrared Spectrophotometer.

2. a) Explain the construction and working principle of Time of flight of mass analyzer.
   b) i) Mass spectrum of pentane produced a molecular ion peak at m/e 72. It also showed peaks at m/e 57, 43 and 29. Identify these possible fragments of pentane.
   ii) Mass spectrum of a molecule showed molecular ion peak and its isotopic peak in 1:1 ratio. What is the possibility of the atom present in the molecule?
   iii) The molar absorption co-efficient of tyrosine in water is 1280 M^{-1} cm^{-1} at 280 nm. Calculate the concentration of tyrosine solution in water if the absorbance of the solution is 0.34 measured in a 1 cm path length cell.

II. Write notes on: **(7 x 5 = 35)**

1. Explain the different types of electronic transitions involved in UV Spectroscopy.
2. Discuss the principle and applications of X-ray diffraction method.
3. Write the principle and interferences of Flame Emission spectroscopy.
4. With examples, explain the relationship of chemical structure to fluorescence spectra.
5. Describe the principle and application of zone electrophoresis.
6. Write short notes on spin-spin coupling.
7. Explain the principle and applications of Radio immuno assay.

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

[LO 931] MAY 2019 **Sub. Code: 2931**

M.PHARM. DEGREE EXAMINATION
(PCI New regulations 2016)
SEMESTER-I
PHARMACEUTICS – MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Explain theory and instrumentation of Mass spectrometry.
   b) Explain various methods to simplify the NMR Spectra.

2. a) Write on principles of separation and detection methods in HPLC.
   b) Give the factors affecting resolution and peak shapes of compounds in HPLC.

II. Write notes on: **(7 x 5 = 35)**

1. Give an account of qualitative and quantitative analysis using UV spectroscopy.
2. Write principle and importance of Radioimmuno assays.
3. Calculate the concentration of compound X using A (1%, 1cm) 9 at wavelength 2.57nm, at a 1.5cm cell, with absorbance 0.4527.
4. What are the factors affecting vibrational frequency?
5. Describe Bragg's Law and its application to pharmaceuticals.
6. Write principle of electrophoresis techniques.
7. Calculate the Resolution and number of theoretical plates for compound A with Rt-4.2 min, peak width 1mm and compound B with Rt-8.1 min having peak width 1mm.

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

[LP 931] NOVEMBER 2019 **Sub. Code: 2931**

M.PHARM. DEGREE EXAMINATION
(PCI New regulations 2016)
SEMESTER-I
BRANCH I – PHARMACEUTICS – MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Write on theory of fluorescence spectroscopy and its applications.
   b) Explain the factors affecting fluorescence spectra of a compound.

2. a) Explain fragmentation rules in Mass spectrometry. Briefly write on interpretation of Mass Spectra.
   b) Give an account on MALDI.

II. Write notes on: **(7 x 5 = 35)**

1. Give an account on electron capture detector and Flame ionization detectors of GC.
2. Chemical shift and its importance.
3. Two compounds (A&B) separated in a 25cm column with an Rt of 5,2min(A), and 12min(B). The peak width read as 1.2 (A) and 1.5(B). Find the resolution and efficiency of system.
4. What are the absorption principles and laws governing UV absorbance?
5. Write on affinity chromatography.
6. The absorbance of a compound is 0.4789, where A (1%,1cm) is 715 at 275nm in a 1 cm sample cell. Calculate the concentration.
7. Explain X-ray crystallography.

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

[LQ 0121] JANUARY 2021 Sub. Code: 2931

(APRIL 2020 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION

SEMESTER-I (PCI New regulations 2016)

PHARMACEUTICS – MPH

PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Explain the theory of U.V absorption and add a note on effect of Auxochromes on Chromophores.
   b) With a neat diagram, explain the construction and working of double beam UV-Visible Spectrophotometer.

2. a) Describe the principle and working of HPLC with a neat labeled diagram.
   b) With neat labeled diagram, explain the principle and instrumentation of Gas liquid Chromatography.

II. Write notes on: **(7 x 5 = 35)**

1. Explain the sampling techniques used in infrared spectroscopy.
2. Write the principle involved in Flame emission spectroscopy.
3. Discuss the principle of nuclear magnetic spectroscopy.
4. Write the theory and various types of ions produced in mass spectroscopy.
5. Write a note on the principle of Radio Immuno Assay.
6. How X-rays are generated? Briefly explain X-ray powder diffraction method.
7. Explain briefly about Gel Electrophoresis.

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

[MPHARM 0921] SEPTEMBER 2021 Sub. Code: 2931
(OCTOBER 2020 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER-I (PCI New regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
Q.P. Code : 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Principle, instrumentation and application of AAS.
   b) Principle involved in Ion exchange chromatography.

2. a) Brief outline of principles of FT-NMR and 13C NMR.
   b) Applications of NMR spectroscopy, Chemical shift, Spin-Spin coupling, Coupling constant.

II. Write notes on: **(7 x 5 = 35)**

1. Column Chromatography.
2. Different X-Ray diffraction methods.
3. Capillary electrophoresis.
4. Paper chromatography.
5. Mass fragmentation and its rules.
6. Sampling in IR Spectroscopy.
7. Applications of fluorescence spectrophotometer.

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

[MPHARM 0122] JANUARY 2022 Sub. Code: 2931
(APRIL 2021 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER-I (PCI New regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
Q.P. Code : 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Production of X-Rays, Different X-Ray diffraction methods, Bragg‘s law.
   b) Applications of X-Ray diffraction.

2. a) Write the principle, instrumentation and application of Flame Emission Spectroscopy.
   b) Compare FES & AAS.

II. Write notes on: **(7 x 5 = 35)**

1. Bioluminescence assays.
2. Rotating crystal technique and X-Ray powder technique.
3. Capillary electrophoresis.
4. Gas chromatography.
5. Applications of Mass spectroscopy.
6. Spin-Spin coupling and Coupling constant.
7. Paper Chromatography.

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

[MPHARM 0422] APRIL 2022 Sub. Code: 2931
(OCTOBER 2021 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER-I (PCI New regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
Q.P. Code : 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier -Transform IR Spectrometer.
   b) Applications of IR spectroscopy.

2. a) Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization.
   b) Isotopic peaks and Applications of Mass spectroscopy.

II. Write notes on: **(7 x 5 = 35)**

1. Applications of NMR spectroscopy.
2. Analyzers of Quadrupole and Time of Flight.
3. Thin Layer chromatography.
4. Moving boundary electrophoresis.
5. Types of crystals and applications of X-Ray diffraction
6. ELISA.
7. Applications of UV Visible Spectroscopy.

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

[M.PHARM 0922] SEPTEMBER 2022 Sub. Code: 2931
(APRIL 2022 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code : 262931

Time : Three hours Answer ALL Questions Maximum : 75 Marks

I. Elaborate on: (2 x 20 = 40)

1. a. Define Zone electrophoresis. Explain its principle and instrumentation.
   b. Define Beer-Lambert law and its limitations.
   c. Define chromophore. Write notes on conjugation of chromophore.
   d. Give notes on Photomultiplier tubes.

2. a. Explain the principle and instrumentation of column chromatography.
   b. Gives notes on principle and instrumentation of paper electrophoresis.

II. Write notes on: (7 x 5 = 35)

1. Define chromatography. Explain about it's various separation methods.
2. Explain the relation between intensity of fluorescence and its concentration.
3. Explain about the X-ray microprobe analyzer.
4. Explain the principle and applications of Enzyme linked immunosorbent assay.
5. Review the factors affecting vibrational frequencies.
6. Explain the principle involved in electrophoresis techniques.
7. Define the following:
   a. Fluorescence b. Phosporescence c. Absorption d. Partition
   e. Emission.

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

[M.PHARM 0423] APRIL 2023 Sub. Code: 2931
(OCTOBER 2022 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time: Three hours **Answer ALL Questions** **Maximum: 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a. Explain the instrumentation of atomic absorption spectroscopy.
   b. Outline the principles of Fourier Transformer for NMR and C^{13} NMR.

2. a. Explain the principle and instrumentation of Iso electric focusing.
   b. Explain briefly about detectors used in IR Spectroscopy.

II. Write notes on: **(7 x 5 = 35)**

1. How can you separate serum proteins by paper electrophoresis?
2. Define spectrometer. Describe the components of spectrometer and their use.
3. Define thin layer chromatography. Summarize the factors affecting separation in Thin layer chromatography.
4. Define capillary electrophoresis. How compounds are separated by capillary Electrophoresis?
5. Define quenching. Discuss the factors affecting quenching.
6. Principle and applications of bioluminescence assay.
7. Compare and contrast ascending and descending paper chromatography.

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

[M.PHARM 0823] AUGUST 2023 Sub. Code: 2931
(APRIL 2023 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New Regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a. Explain the various factors affecting the chemical shift in NMR spectroscopy.
   b. Describe the principle and any two types of ionization methods in mass spectrometry.

2. a. Explain the principle and instrumentation of GLC with a neat diagram.

   b. Explain why beta-carotene is orange in colour.

   c. Calculate the concentration of 1,10 phenonthroline, if its molar absorptivity is 12,000 mol/I. 'A' is 0.004 and 'b' is 5 cm.

   d. Explain which of the following molecule is expected to show intense IR absorption at 1710 cm^{-1}?
   i) H2C = CH- CH2 CH2 CH2 CH3 ii) $(CH_3)_2CHCOOH$
   iii) $(CH_3)_2CHNH_2$ iv) $CH_3CH(CH_3)CH_2CH_2CH_2CH_3$

   e. Explain why CH_3-C≡C-CH_3 is not showing IR absorption at 3300 cm^{-1}?

II. Write short notes: **(7×5 = 35)**

1. State and explain Beer-Lambert Law. Write briefly about the deviations of the absorption laws.
2. Write a note on FTNMR and coupling constant.
3. Explain the application and various interferences occurring in atomic absorption spectroscopy.
4. Describe the various factors affecting the fluorescence.
5. Explain the sample handling technique used in IR spectra.
6. Discuss the principle and factors affecting separation of paper electrophoresis.
7. Explain the various chromatographic parameters involved in HPLC.

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

[M.PHARM 1223] DECEMBER 2023 Sub. Code: 2931
(OCTOBER 2023 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New Regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time : Three hours **Answer ALL Questions** **Maximum : 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a. Elaborate on principle and instrumentation of Nuclear Magnetic Resonance Spectroscopy.
   b. Give notes on time of flight of Mass analyser.
   c. Give notes on electronic transition of UV spectroscopy.

2. a. Define molecular spectra. Explain its principle involved in Jablonski diagram.
   b. Define immunological assay. Explain ELISA test and its applications.

II. Write short notes: **(7×5 = 35)**

1. Explain about the spin-spin coupling.
2. Write notes on quadrupole analysers.
3. Explain about quenching effect and various factors influencing it.
4. Explain about the basic principle involved in immunological assays.
5. Compare and contrast paper and thin layer chromatography.
6. Give detailed account on moving boundary electrophoresis.
7. Define the following:
   a. Chromatography b. chromatogram c. Eluant d. Elute e. Resolution.

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

[M.PHARM 0524] MAY 2024 Sub. Code: 2931
(APRIL 2024 EXAM SESSION)

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New Regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time: Three hours **Answer ALL Questions** **Maximum: 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Explain dispersive and fourier transformer IR spectrometry.
   b) Explain interpretation and baseline technique used in IR spectra.

2. a) Using simultaneous equation method find out concentration of A and B in mixture showing 0.3697 and 0.1805 respectively at 219nm and 256nm. Absorbance of standard compound A (9mcg/ml) at 219nm, 256 nm is 0.0297, 0.2751, respectively. Absorbance of standard compound B (10 mcg/ml) at 219nm, 256 nm is 0.7791, 0.117, respectively. The wavelength maxima of A is 256nm and B is 219nm.
   b) Write basic concepts of TOF and Quatrapole Mass Spectrometry.

II. Write short notes: **(7×5 = 35)**

1. Write on instrumentation and working of a high performance thin layer chromatography.
2. Explain determination of structure of compounds by using X-ray diffraction.
3. Write on detection of compounds in HPLC.
4. Give principles of ^{13}C NMR and FT-NMR.
5. Briefly write on interferences in Atomic absorption and Flame emission spectroscopy.
6. Write on principles, exchanger mechanism in ion exchange chromatography.
7. Write process of fluorescence and its pharmaceutical applications.

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

[M.PHARM 0425] **APRIL 2025** **Sub. Code: 2931**

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New Regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time: Three hours **Answer ALL Questions** **Maximum: 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Brief outline of principles of FT-NMR and 13C NMR.
   b) Applications of NMR spectroscopy, Chemical shift, Spin-Spin coupling, Coupling constant.

2. a) Describe the principle and any two types of Ionization methods of Mass Spectroscopy.
   b) Applications of IR spectroscopy.

II. Write short notes: **(7×5 = 35)**

1. Write a note on detectors used in HPLC.
2. With a neat, labelled diagram, explain the construction and working of double beam UV-Vis Spectrophotometer.
3. Principle and application of Radio immuno Assay.
4. Explain the sample handling techniques used in IR spectra.
5. Discuss the principle and applications of X-ray diffraction method.
6. Write about the interferences in Flame emission spectroscopy.
7. Write on affinity chromatography.

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

[M.PHARM 1025] **OCTOBER 2025** **Sub. Code: 2931**

M.PHARMACY DEGREE EXAMINATION
SEMESTER - I (PCI New Regulations 2016)
PHARMACEUTICS - MPH
PAPER I – MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

Q.P. Code: 262931

Time: Three hours **Answer ALL Questions** **Maximum: 75 Marks**

I. Elaborate on: **(2 x 20 = 40)**

1. a) Explain the principle and instrumentation of column chromatography.
   b) Give notes on principle and instrumentation of paper electrophoresis.

2. a) Explain the principle and instrumentation of U-V visible spectrophotometer.
   b) Applications of IR spectroscopy.

II. Write short notes: **(7×5 = 35)**

1. Explain about quenching effect and various factors influencing it.
2. Explain the principle and applications of Enzyme linked immunosorbent assay.
3. Affinity Chromatography.
4. Compare and contrast ascending and descending paper chromatography.
5. Explain the various chromatographic parameters involved in HPLC.
6. Explain determination of structure of compounds by using X-ray diffraction.
7. Write process of fluorescence and its pharmaceutical applications.

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