

Indian Institute Of Ayurvedic Pharmaceutical Sciences
Pharmaceutical Analysis of ayurvedic Drugs - II
B. Pharm. IIIrd Year
Year 2015- 2016

Question Bank

Chapter: 1

**Introduction to chromatography and instrumental analysis in Ayurvedic Pharmacy.
(History, Classification, Step by step progress, Importance)**

[10 marks]

1. Define Chromatography. Give classification of Chromatography in brief.
2. Describe the revolution in instrumental methods of analysis in brief.
3. Which are the different methods of instrumental analysis applicable in Ayurveda?

Chapter: 2

Introduction, Instrumentation, scope and application of PC (History, Introduction, Principle, Types, Instrumentation, application)

[10 marks]

1. Explain the principle of Paper chromatography and give its instrumentation and applications in detail.
2. Describe the types of Paper chromatography and explain its applications in detail.
3. How will you separate a mixture of amino acids by the use of paper chromatography?
4. Define chromatography. Explain its classification. What is ascending paper chromatography?

[5 marks]

1. Types of paper chromatography with diagram.
2. Types of Stationary phase used in Paper chromatography.
3. Explain the principle of Paper Chromatography.
4. How to select solvent system for paper chromatography.

Chapter: 3

GC (History, introduction, principle, types in brief, instrumentation in detail, types of detectors in detail, types of column, applications)

[10 marks]

1. Discuss detectors in gas chromatography in detail.
2. Write down the principle, instrumentation and applications of gas chromatography.
3. Enumerate the essential requirements for substance to be analysed in G.C.
Give instrumentation with block diagram.
4. Explain the principles of gas-chromatography. What are the ideal characteristics of the detectors?
5. Explain the instrumentation of gas-chromatography with appropriate diagram. What are the applications of this method in the field of Ayurveda.
6. How are Gas chromatography and Gas liquid chromatography methods different? Explain their instrumentation and application to Ayurvedic medicines.

[5 marks]

1. Types of Detector used in Gas chromatography.
2. Applications of G.C. as applicable to ayurveda.
3. Draw the schematic diagram of GC instrument.
4. Mention applications of Gas Chromatography.
5. Define gas liquid chromatography and explain.
6. Different types of carrier gas used in GC.

[2 marks]

1. G.S.C.
2. G.L.C.
3. T.C.D.
4. F.I.D.

Chapter: 4

TLC (Introduction, Principle, Types, Instrumentation in detail-types of stationary phase, mobile phases, importance of chamber saturation, detection/Visualization techniques in detail, application)

[10 marks]

1. Discuss scope and application of planer chromatography in Ayurvedic pharmacy.
2. Define chromatography. Explain the principle of thin layer chromatography. Explain the separation of a mixture of components in Taila by TLC.
3. Which are the different spraying agents used in TLC for identification of different phyto constituents? Atleast 8.

[5 marks]

1. What are the applications of thin layer chromatography?
2. Steps of thin layer chromatography .
3. Stepwise chromatographic development in thin layer chromatography.
4. Post chromatographic derivatisation.
5. Different Spray reagents with its uses.
6. Types of stationary phases used in TLC.
7. Basis of Choice of solvent system.
8. Destructive methods of visualisation of components.
9. Non-destructive methods of identification of components.
10. Importance of Chamber saturation in TLC.
11. Types of Chambers used in TLC.
12. Write a short note on preparation of Plates.

[2 marks]

1. Enumerate 5 spray reagents.
2. Enumerate 5 stationary phases.
3. Define: Derivatization.
4. Define: R_f Value
5. Define: Chromatography.
6. Define: Chromatogram.
7. Define: Eluent.
8. Define: Chromatograph.
9. Define: Edge effect.

Chapter: 5

HPLC (Introduction, benefits over other techniques, principle, Instrumentation in detail- types of columns in brief, types of pumps in brief, types of detectors in brief, applications)

[10 marks]

1. Define HPLC. Mention its principle. Draw the diagram of its instrumentation and Explain.
2. In HPLC how its performance can be enhanced compared to conventional column chromatography.
3. A brief not on instrumentation of HPLC with a block diagram.

[5 marks]

1. Why guard column is used prior to analytical column in HPLC?
2. Different types of columns used in HPLC.
3. Different types of Detectors used in HPLC.
4. Applications of HPLC in Detail.
5. Give a neat diagram of Instrumentation of HPLC.
6. Types of pumps used in HPLC.
7. Difference between HPLC and traditional Column chromatography.

[2 marks]

1. Guard column.
2. HPLC
3. Degasser.
4. RP-HPLC
5. NP-HPLC
6. Define: R_t

Chapter: 6

HPTLC (Introduction, Principle, Instrumentation – types of stationary phase, mobile phase, types of chambers, spotting techniques, techniques of chromatogram development, visualization techniques, detectors, Recorders, applications).....

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Chapter: 6

HPTLC (Introduction, Principle, Instrumentation – types of stationary phase, mobile phase, types of chambers, spotting techniques, techniques of chromatogram development, visualization techniques, detectors, Recorders, applications)

[10 marks]

1. What is HPTLC? Explain in detail with instrumentation.
2. Explain the difference between TLC and HPTLC & describe the instrumentation.
3. Discuss instrumental up-gradation available in thin layer chromatography.
4. Applications of HPTLC with examples as applicable to ayurvedic drugs.

[5 marks]

1. How performance has been improved in HPTLC compare to classical TLC.
2. Stationary phases in HPTLC.
3. TLC chambers used in HPTLC.
4. How spotting would affect the resolution of separated bands in HPTLC.
5. Different spray reagents used in HPTLC.
6. How the HPTLC plates differ than TLC plates?

[2 marks]

1. HPTLC
2. Rf value
3. Enumerate 4 stationary phases for HPTLC

Chapter: 7

Column chromatography (Introduction, Principle, Instrumentation – types of columns, selection criteria of columns, stationary phases, selection criteria of stationary phase, mobile phases, component recovery, visualization techniques, applications).

[10 marks]

1. Describe the principle of column chromatography and explain its instrumentation in detail.
2. Describe the column packing techniques in detail and which one is better? Explain
3. What is the scope of column chromatography? Explain its Instrumentation.
4. Explain the principle and working of Column Chromatography.

[5 marks]

1. Method of development in column.
2. Explain the principle and applications of column chromatography.
3. Applications of Column chromatography as applicable to ayurvedic drugs.
4. Packing techniques in column chromatography.
5. Development procedures in column chromatography.
6. What are the criteria for selection of stationary phase in Column preparation?
7. Recovery of components in column chromatography.

[2 marks]

1. Isocratic elution.
2. Gradient elution.
3. Eluent.
4. Preparative chromatography.

Chapter: 8

Ion exchange Chromatography

(Introduction, classification of ion exchange resins, types of resins, instrumentation in brief, applications) in Ayurvedic Pharmacy.

[10 marks]

1. Explain the application of Ion Exchange Chromatography in Ayurved.
2. What is Ion exchange chromatography? How does it work? Explain any one factor which affects this method.
3. Discuss applications and uses of ion exchange chromatography in Ayurvedic pharmacy.
4. How ion exchange resin may be reconstituted?
5. Describe Structural types of ion exchange resins in detail.
6. Classification of resins as in ion exchange chromatography.

[5 marks]

1. Applications of ion exchange resins.
2. What is principle of ion exchange chromatography? Explain.
3. Examples of Cation and Anion exchange resins. Enumerate practical requirements in ion exchange chromatography.
4. Describe physical properties of resins.

[2 marks]

1. Examples of Cation exchange resins.
2. Examples of Anion exchange resins.
3. Define Cation Exchange resin
4. Define Anion exchange resin.

Chapter: 9

Introduction, Instrumentation, scope and application of **Flame Emission**

Spectroscopy(Flame Photometry) (Introduction, principle, theory, instrumentation – types of flame , combination of fuels and oxidents, types of burners, detectors, use of mirrors, factors affecting flame intensity, applications)

[10 marks]

1. Give an account of Flame Emission spectroscopy.
2. Scope and applications of atomic emission spectroscopy.
3. What is F.E.S.? Describe its instrumentation in detail.
4. Explain the theory of F.E.S. and give its applications.

[5 marks]

1. Theory of Flame emission spectroscopy.
2. Write a short note on Burner system used in Flame photometry.
3. Mention all Fuel and Fuel oxidant combinations in detail.
4. Applications of Flame photometry in detail.

[2 marks]

1. Enumerate fuel combinations used in F.E.S.
2. Which elements are quantified by F.E.S.?
3. Role of Atomiser.

Chapter: 9

Fluorimetry (Introduction, theory, instrumentation – light sources, types of fluorimeters, applications)_ **Phosphorimetry** (Introduction, theory, factors affecting luminescence, instrumentation – types of instruments, applications)

[10 marks]

1. Explain with diagram the functioning of a double beam fluorimeter.
2. What is fluorescence and phosphorescence? Describe the factors affecting the fluorescence intensity.
3. Give a detail account of instrumentation of Rotating cane and rotating disc phosphoroscope.
4. Write down the instrumentation and application of spectro fluorimeter.
5. Give a detail account on instrumentation of double beam fluorimeter.

[5 marks]

1. Rotating CANE phosphoroscope.
2. Rotating disc phosphoroscope.
3. Theory of phosphorescence.
4. Applications of fluorimetry in detail.
5. Difference between fluorescence and phosphorescence.

[2 marks]

1. Fluorescence.
2. Define: Phosphorescence.
3. What is singlet state?
4. What is triplet state?
5. What is the use of primary filter?

Chapter: 10

**Turbidimetry (Introduction, principle, theory, instrumentation, applications) ,
Nephelometry (Introduction, principle, theory, instrumentation, applications)**

[10 marks]

1. Distinguish between terms: (i) Refraction and scattering.
(ii) turbidimetry and colorimetry.
2. What is the difference between Turbidimetry and Nephelometry?
3. Write down the principle and working of Turbidimetry in detail.
4. Write down the principle, instrumentation and applications of nephelometer.

[5 marks]

1. Describe the terms reflection, refraction and scattering.
2. Nephelometry v/s. Turbidimetry.
3. Enumerate factors responsible for producing uniform turbidity.
4. Factors responsible for intensity of scattered radiation.
5. Applications of turbidimeter and nephelometer.

[2 marks]

1. Define: Nephelometry
2. Define: Turbidimetry.
3. Source of light in turbidimetry.
4. Enumerate different types of sample cells used in turbidimetry.

Chapter: 11

pH metry (Introduction, principle, theory, instrumentation – types of electrodes, applications) & Potentiometry in brief.

[10 marks]

1. Define pH metry and potentiometry. Write a note on reference electrodes.
2. What do you mean by pH? Describe glass electrode with diagram and give its applications.
3. Enumerate indicator electrodes and describe them in brief.

[5 marks]

1. Saturated calomel electrode.
2. Glass electrode.
3. Types of electrodes in brief.

[2 marks]

1. Define: pH
2. Who invented pH scale?
3. Acidic range of pH
4. Basic range of pH
5. pH scale.

Chapter : 12

Refractometry (Introduction, definition, Theory, principle, Instrumentation, types of refractometers, applications)

[10 marks]

1. What is refractometry? Explain its principle and working of instrument with diagram.
2. Define refractive index. Enumerate different types of instruments and describe Abbe's refractometer in brief.

[5 marks]

1. Explain the theory of refractive index in brief.
2. Applications of refractometry in detail.
3. Abbe's refractometer.

[2 marks]

1. Define refractive index.
2. Critical angle.
3. Enumerate different types of refractometer.

Chapter: 13

Introduction, Instrumentation, scope and application of Spectroscopy like IR/FTIR, U.V.andVisible in Ayurvedic Pharmacy.

[10 marks]

1. Explain different types of Vibrations in I.R.Spectroscopy Explain the instrumentation of infra-red spectrophotometer.
2. What is E.M.R.? Explain instrumentation of U.V.Spectroscopy in detail.
3. What is the basic requirement for a molecule to show absorption of energy in IR region? Mention its applications in detail.
4. State the principle and explain instrumentation technique of ultraviolet spectroscopy.
5. Define spectra. Explain principle and method of functioning an IR spectrophotometer.

[5 marks]

1. Applications of u.v. spectroscopy in detail.
2. Explain different types of vibrations in I.R. spectroscopy.
3. Types of electronic transition in u.v. spectroscopy.
4. Double beam colorimeter.
5. Applications of I.R. spectroscopy in detail.
6. Different types of detectors used in spectrophotometers in brief.

[2 marks]

1. Red shift.
2. Blue shift.
3. Bathochromic shift.
4. Hypsochromic shift.
5. Chromophore.
6. E.M.R.
7. Wavelength
8. Wave number.
9. Sampling in I.R.
10. Sources of I.R. radiation.
11. Sources of U.V. radiation.
12. Monochromator.

Chapter: 14

Basic brief introduction of Polarography, X-ray diffraction and DSC(Differential Scanning Calorimeter).

[10 marks]

1. Scope and applications of polarography in Ayurvedic pharmacy.
2. Scope and applications of X-ray diffraction analysis methods.

[5 marks]

1. What are the application of DSC in Ayurvedic pharmacy?
2. Theory of polarography in brief.

[2 marks]

1. What is the full form of D.S.C.?
2. What is the full form of T.G.A.?
3. X-ray diffraction.