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

[BPHARM0422] APRIL 2022 Sub. Code: 2087
(SEPTEMBER 2021 SESSION)

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 SEMESTER VIII
PAPER XI - ADVANCED INSTRUMENTATION TECHNIQUES
Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the working principle and construction involved in GC-MS/MS.
2. Discuss the Different types of Analysers used in mass spectroscopy.
3. Write the principle and instrumentation of DTA with a neat diagram.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Explain the Relaxation process in NMR.
2. Write the Calibration procedure for flame photometer.
3. Explain about ICH guidelines used in method validation parameters.
4. Write the short notes on Applications in SPE.
5. Discuss the Chemical shift in NMR.
6. Explain the fragmentation rules in mass spectroscopy briefly.
7. Write the Calibration procedure for IR spectroscopy.
8. Explain the instrumentation of HPTLC-MS.
9. Explain the factors affecting DSC curve.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Ring rule.
2. Parent ion.
3. Define calorimetry.
4. LOD and LOQ.
5. Long term Stability.
6. Accuracy and Precision.
7. Prospective validation.
8. Give any two differences between Calibration and validation.
9. Define Chemical ionization.
10. Give any two advantages of fast-atom-bombardment interface.

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

[BPHARM 1022] OCTOBER 2022 Sub. Code: 2087
(MARCH 2022 SESSION)

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER XI - ADVANCED INSTRUMENTATION TECHNIQUES
Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Write the principle and instrumentation of DSC with a neat diagram.
2. Discuss the calibration procedure for Fluorimetry.
3. Explain calibration and validation using ICH guidelines.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Write short notes on Solid Phase Extraction.
2. Write the Calibration procedure for flame photometer.
3. Explain the applications of LLE.
4. Write the Applications of RIA.
5. Write short notes on Moving belt and Thermospray interfaces in LC-MS.
6. Write the principle involved in NMR spectroscopy.
7. Write the Calibration procedure for HPLC.
8. Explain the MALDI and Fast atom bombardment ionization in mass spectroscopy.
9. Give the Applications of Thermogravimetry.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Parent ion.
2. Factors affecting chemical shift.
3. Spin-Spin lattice.
4. Hydrogen deficiency index.
5. Scattering and diffraction.
6. Concurrent validation and process validation.
7. Crystal Monochromator.
8. Write any two applications of HPTLC-MS.
9. Give any two advantages of Calibration.
10. Mention detectors used in X-Ray diffraction.

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

[B.PHARM 0323] MARCH 2023 Sub. Code: 2087
(SEPTEMBER 2022 EXAM SESSION)

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES
Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the principle, instrumentation and applications of Nuclear Magnetic Resonance spectroscopy.
2. Explain in detail about the working and the types of inter phases used in working of GC-MS.
3. Write the principle, methods and applications of radio immune assay.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Write the principle involved in mass spectroscopy.
2. Write the steps involved in Solid phase extractions.
3. What are the factors to be considered for selection of solvent in liquid-liquid extraction?
4. Explain the principles and applications involved in Differential Scanning Calorimetry.
5. Describe with neat diagram the working of X-ray tube.
6. Define validation and write the need for validation of a method.
7. Write short notes on thermo-gravimetric analysis.
8. Explain in detail about MALDI.
9. Explain the calibration parameters of an IR spectrophotometer.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Define Accuracy.
2. Define Precision.
3. Define M^+ Peak.
4. Write any two applications of liquid – liquid extraction.
5. Write any two applications of X-ray diffraction.
6. Define Partition coefficient.
7. Write any two applications of LC-MS.
8. Define chemical shift.
9. Write the Bragg's Equation.
10. Define Concurrent validation.

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

[B.PHARM 0823] AUGUST 2023 Sub. Code: 2087
(MARCH 2023 EXAM SESSION)

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES
Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain in detail about the working and the types of inter phases used in working of HPTLC-MS.
2. Explain the principle, instrumentation and application of mass spectroscopy.
3. Define calibration and explain different calibration parameters of high performance liquid chromatography.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Explain the principle of Nuclear Magnetic Resonance spectroscopy.
2. Explain the principle and applications of Differential Thermal Analysis (DTA).
3. Write the principle involved in radio immune assay.
4. Write in detail about the principle, instrumentation and applications of rotating crystal technique.
5. Define calibration and write the need for calibration of a method.
6. Write the principle and working of Jet orifice separator in GC-MS.
7. Explain the principle involved in chemical ionization of mass spectroscopy.
8. Explain the calibration parameters of a Flame Photometer.
9. Explain briefly liquid – liquid extraction.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Define Ruggedness.
2. Define Specificity.
3. Define Concurrent validation.
4. Define chemical shift.
5. Define nitrogen rule in mass spectroscopy.
6. Define radio labeling.
7. Write any two applications of X-ray diffraction methods.
8. Define Thermogram.
9. Write the applications of differential scanning calorimetry.
10. What is MALDI?

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

[B.PHARM 1223] DECEMBER 2023 Sub. Code: 2087
(SEPTEMBER 2023 EXAM SESSION)

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES
Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Write the different types of ionization techniques in mass spectroscopy and explain about any two types of ionization technique.
2. Explain in detail about the Principle, instrumentation and applications Thermo gravimetric Analysis.
3. Write the principle, steps and applications of radio immune assay.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Describe in brief about shielding and deshielding effect in NMR spectroscopy.
2. Write the factors affecting liquid-liquid extractions.
3. Write in detail about the calibration of analytical balance.
4. Explain the validation parameters as per ICH guidelines.
5. Write in detail about the principle, instrumentation and applications of powder diffraction crystallography.
6. Write the principle in solid phase extraction.
7. Explain the Instrumentation involved in Nuclear Magnetic Resonance spectroscopy.
8. Explain the calibration of a Fluorimeter.
9. Explain briefly about LC-MS/MS.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Define Linearity.
2. Define Robustness.
3. Write any two applications of GC-MS.
4. Define Retrospective validation.
5. Define Chemical shift.
6. Define Base peak in mass spectroscopy.
7. Define calibration and validation.
8. Define antigen and antibody.
9. What are the solvents used in Nuclear Magnetic Resonance spectroscopy?
10. Define precessional frequency.

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

[B.PHARM 0524] **MAY 2024** **Sub. Code: 2087**

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES

Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the working principle and construction involved in Interfaces in LC-MS/MS.
2. Discuss the Different ionization methods in mass spectroscopy
3. Write the principle and instrumentation of NMR with a neat diagram.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Explain the pumps used in HPLC.
2. Give short notes on Columns used in GC.
3. Explain the instrumentation of HPTLC.
4. Explain the working principle and construction involved in Interfaces in GC-MS/MS.
5. Write short notes on Applications in LLE.
6. Discuss the principle in SPE.
7. Discuss the Different methods of Radio immuno assay.
8. Write the Calibration procedure of Gas chromatography.
9. Discuss the Calibration procedure of UV spectroscopy.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Chemical shift.
2. Nitrogen rule.
3. Coupling constant.
4. Metastable ions.
5. Types of Thermogravimetry.
6. Define Heat Capacity.
7. Derive Bragg’s law.
8. Freeze Thaw stability.
9. Give any two applications of powder crystal method.
10. Why is TMS used as internal standard in NMR?

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

[B.PHARM 1024] OCTOBER 2024 Sub. Code: 2087
(SEPTEMBER 2024 EXAM SESSION)

B. PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES

Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the principle and instrumentation of Mass Spectrometry.
2. Explain in details about X-Ray Diffraction Methods and discuss its applications.
3. Write the calibration and validation of UV-Visible Spectrophotomer and HPLC.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Write in detail about C^{13} NMR.
2. Discuss the relaxation process in NMR.
3. Write the principle and applications of Differential Thermal Analysis.
4. Explain applications of Mass Spectrometry.
5. Discuss the calibration of flame photometer.
6. Explain in detail about ELISA.
7. Explain about Liquid-liquid Extraction.
8. Give the applications of Thermogravimetric Analysis.
9. Write short notes on LC-MS/MS.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. What are the ideal requirements of solvents used in NMR?
2. Chemical Shift.
3. Calibration.
4. Base Peak.
5. Write any two applications of RIA.
6. Explain LOD and LOQ.
7. Enumerate mass analyzers in Mass spectrometry.
8. Mention the detectors used in X-Ray Diffraction.
9. Define fragmentation.
10. Write any two applications of GC-MA/MS.

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

[B.PHARM 0925] **SEPTEMBER 2025** **Sub. Code: 2087**

B. PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 - SEMESTER VIII
PAPER VII - ADVANCED INSTRUMENTATION TECHNIQUES

Q.P. Code: 562087

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

I. Elaborate on: Answer any TWO questions. **(2 x 10 = 20)**

1. Write the principle, instrumentation and applications of (DSC) Differential Scanning Calorimetry.
2. Explain in details various ionization methods in Mass Spectrometry.
3. Write the principle, different methods and applications of RIA.

II. Write notes on: Answer any SEVEN questions. **(7 x 5 = 35)**

1. Explain Spin – Spin Coupling in NMR.
2. Explain about fragmentation with suitable example in Mass Spectrometry.
3. Write the principle and applications of TGA.
4. Explain rotating crystal technique in X-ray diffraction.
5. Discuss the calibration of UV-Visible Spectrophotometer.
6. Explain in detail about limitations of RIA.
7. Explain about Solid Phase Extraction.
8. Give the applications of DTA.
9. Write short notes on HPTLC-MS.

III. Short answers on: Answer ALL questions. **(10 x 2 = 20)**

1. Coupling constant.
2. TMS in NMR Spectroscopy.
3. Bragg's Law.
4. Validation.
5. Precision and Accuracy.
6. Nitrogen rule in Mass spectroscopy.
7. Linearity.
8. TOF.
9. Spin Quantum Number.
10. Molecular ion peak.

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