# Question Paper

Exam Date & Time: 19-May-2023 (10:00 AM - 01:00 PM)

## MANIPAL ACADEMY OF HIGHER EDUCATION

BPharm VIIIth Semester
End Semester Examination May 2023

**Advanced Instrumentation Techniques [PQA-BP811ET -S1]**

**Marks: 75** **Duration: 180 mins.**

**I Multiple Choice Questions (MCQs)**

**Answer all the questions.** Section Duration: 30 mins

1) An anisotropic effect causes shielding in the_____molecule. (1)

- Alkynes
- Alkene
- Benzene
- Aldehyde

2) The higher the electronegativity of the atom__ is the deshielding caused to proton (1)

- Neutral
- Less
- Greater
- Average

3) ___ Spin state has high energy of nucleus. (1)

- β
- √
- α
- μ

4) Which among the following is a "hard ionization" technique? (1)

- Electrospray Ionization
- Electron Ionization
- Matrix Assisted Laser desorption ionization
- Atmospheric Pressure Chemical Ionization

5) The peak observed with the highest % abundance in a mass spectrum is (1)

- Molecular ion peak
- Base peak
- Isotopic peak
- Fragment ion peak

6) Unit cell parameter for the Triclinic crystal is (1)

- α = β = 90°
- α = β = γ = 90°

α ≠ β ≠ γ ≠ 90°

α = β = γ ≠ 90°

7) The main function of the GC column oven is to provide ---------- as per analysis requirements (1)

- High pressure
- High Temperature
- High humidity
- High Vacuum

8) Which method is mostly preferred for calibrating instruments that are non-critical to quality (1)

- Standard calibration
- Calibration with data
- ISO 17025 Accredited Calibration
- NABL method

9) Premarket validation is also called as (1)

- Re-validation
- Retrospective validation
- Prospective validation
- Concurrent validation

10) Analytical balance uncertainty check can be calculated by (1)

- (Standard Deviation ∗3)/(Actual mass Value)
- (Slope ∗3)/(Actual mass Value)
- (Standard Deviation ∗6)/(Actual mass Value)
- (Slope ∗6)/(Actual mass Value)

11) One of the following reagent is used in the Calibration of UV-Visible spectrometer for control of absorbance as per IP 2018. (1)

- NaOH
- Potassium dichromate
- Sulfuric acid
- Holmium oxide

12) FT-IR stands for (1)

- Fourier-transform instrumental spectroscopy
- Fourier-transfuse infrared spectroscopy
- Fluori-transform infrared spectroscopy
- Fourier-transform infrared spectroscopy

13) One of the following is a Beta emitter (1)

- $^{121}I$
- $^{131}I$
- $^{125}I$
- $^{3}H$

14) Radioactivity in the microtiter wells in Radio immuno assay is measured using (1)

G M Counters
UV readers
Visible reader
Fluorescent readers

15) In liquid liquid extraction, the organic solvent is evaporated to dryness using (1)

Hot air oven
Steam
Flame
Stream of Nitrogen

16) Antigens are injected .....into Rabbits to stimulate the antibody production. (1)

Intradermally
Intravenously
Intramuscularly
Intrathecally

17) In gas chromatography, separation of the molecule occurs based on _____ (1)

Polarity and molecular weight
Boiling point and melting point
Chemical nature and solubility
Chirality and molecular weight

18) LC-MS/MS is widely used in clinical studies because of its (1)

Sensitivity
Specificity
Ease of usage
Versatility

19) In LC, time taken for the analyte to travel from injection point to the detector is known as _____ (1)

Retention time
Resolution time
Partition time
Travel time

20) Which of the following chromatographic methods can be used for analyzing pharmaceutical excipients like flavours? (1)

GC-MS
LC-MS
HPTLC-MS
LC-NMR

## II Long Answers

**Answer all the questions.**

1) Explain the instrumentation and working of differential thermal analysis with neat schematic diagram. (10)

2) Describe in detail the calibration parameters of UV visible spectrophotometer. (10)

## III Short Answers

**Answer all the questions.**

1) Enlist and discuss the reasons for taking TMS as reference compound in NMR (5)

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|---|---|---|
| 2) | List the available ion sources for a mass spectrometer. Discuss the working of Electron Ionization source. | (5) |
| 3) | Explain the technique used to analyze single crystal using variable angle and fixed wavelength method using neat schematic diagram. | (5) |
| 4) | Comment on the advantages of sample preparation for liquid-liquid extraction. | (5) |
| 5) | Analyze the steps in Radio immuno assay in brief. | (5) |
| 6) | Why LCMS-MS is called as "Hyphenated Technique"? explain. | (5) |
| 7) | What does each term in the following description of LCMS column stands for? | (5) |

C18, 2.1X50mm, 5u, 300Ă

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