



18765-22427-41085



Library
Pharmaceutical Technology
Brainware University
Parasat, Kolkata-700125

BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Pharm-2020/B.Pharm-2021/B.Pharm-2022

Course Name – Advanced Instrumentation Techniques

Course Code - BP811ET

(Semester VIII)

Full Marks : 75

Time : 3:0 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 20=20

1. Choose the correct alternative from the following :

- (i) Identify the calculated delta value if in NMR Spectroscopy chemical moiety at 144Hz value.
 - a) 3.4
 - b) 2.4
 - c) 0.4
 - d) 1.4
- (ii) Select the best one out during the limit of stray light which chemical is used.
 - a) Calcium Chloride.
 - b) Sodium Chloride.
 - c) Magnesium Chloride.
 - d) Potassium Chloride.
- (iii) Recall in Ultraviolet spectrophotometry Lambert law deals with.
 - a) pH of the solution.
 - b) Concentration of solution.
 - c) Appearance of solvent.
 - d) Thickness of cuvette.
- (iv) Select the best one out the inert gas is used for gas chromatography.
 - a) nitrogen.
 - b) argon.
 - c) helium.
 - d) all of these.
- (v) Memorize in solid phase extraction preconditioning done using.
 - a) LCMS grade methanol.
 - b) 10% methanol.
 - c) extracted sample using methanol.
 - d) all of these.
- (vi) Select the procedure for mass spectroscopy starts with which of the following processes.
 - a) The sample is bombarded by electron beam.
 - b) The ions are separated by passing them into electric and magnetic field.
 - c) The sample is converted into gaseous state.
 - d) The ions are detected.
- (vii) Select the two main techniques for thermal analysis.
 - a) FTG AND DGG.
 - b) MSP AND FCT.
 - c) TGA AND DTA.
 - d) TSA AND DGF.
- (viii) Select the range of the rate in °Cmin-1 required during the heating process in TGA.

- a) 1-20. b) 25-50.
c) 100-200. d) 150-1000.
- (ix) Select the temperature required for the decomposition of CaCO_3 in degree Celsius.
- a) 200 b) 500
c) 900 d) 1200
- (x) In NMR spectrum the nuclei in up field resonate operate at,
- a) It is constant throughout the spectrum b) It doesn't depends on chemical shift
c) High frequency d) Low frequency
- (xi) Compute Hz value if in NMR Spectroscopy chemical moeity delta value is 5.
- a) 100 b) 200
c) 300 d) 400
- (xii) Which of the following systems has GC-MS been developed?
- a) Packed column. b) Open tubular column.
c) Capillary column. d) Porous layer column.
- (xiii) Select the correct option, HPTLC working principle is based on,
- a) absorption. b) redistribution.
c) distribution. d) adsorption.
- (xiv) Select in flame photometer principle based on the measurement of the emitted light intensity when a _____ introduced into the flame.
- a) oil. b) paper.
c) wood. d) metal.
- (xv) Select DTA can be used for which of the following process,
- a) Line positions of the crystals. b) Mechanical properties of the crystals.
c) Phase diagrams. d) Catalytic properties of enzymes.
- (xvi) Select for the decomposition of the anhydrous calcium oxalate which of the following steps occur,
- a) Intermediates transition state product. b) Intermediates anhydrous oxalate calcium oxyalts.
c) Intermediates aqueous hydrates calcium hydroxides. d) Intermediates anhydrous calcium oxalate calcium carbonate.
- (xvii) Select in x-ray powder camera technique the detector used is,
- a) Photographic film. b) PMT.
c) Bolometer. d) Thermistor.
- (xviii) Choose the correct option, for NMR the (n+1) rule determines _____
- a) Chemical shift b) Signal splitting
c) Integration d) Relaxation time
- (xix) Choose the correct option, for NMR, coupling constant J is measured in _____
- a) ppm b) Ampere
c) Volt d) Hz
- (xx) Choose the correct option for NMR, Van der Waals deshielding occurs in _____
- a) Free positions b) Sterically hindered positions
c) Non-polar molecules d) Gases

Group-B

(Short Answer Type Questions)

5 x 7=35

2. Describe how signals are measured in NMR. (5)
3. Discuss the principle of NMR Spectroscopy. (5)
4. Discuss the different methods of ionization in mass spectroscopy. (5)

5. Explain "matrix-assisted laser desorption ionization" with a labeled diagram. (5)
6. Write the solvents used for the analysis of components in NMR. Write down the application of NMR. (5)
7. Describe the principle and procedure involved in the solid phase extraction (5)

OR

Explain in detail about the principle of GC-MS/MS. (5)

8. Explain the detailed principle of TGA with a schematic diagram. (5)

OR

Explain the principle of Liquid-Liquid extraction method. (5)

Group-C

(Long Answer Type Questions)

10 x 2=20

9. Define gas phase ionization, mention its types, and describe the chemical ionization process. (10)
10. Explain the terms, molecular ion, fragmented ion, quasi molecular ion and mention the different LASER sources for MALDI. (10)

OR

Explain the powder method used in XRD. (10)
