# BRAINWARE UNIVERSITY

## Term End Examination 2023
## Programme – B.Pharm-2019
## 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) In NMR Spectroscopy select following materials mixed for determining structure?

a) Liquid b) Gases
c) Semisolids d) Insoluble chemical compounds

(ii) In proton NMR spectroscopy, hydrogen bonding results in,

a) Deshielding effect b) Peak splitting
c) Peak broadning d) Shielding effect

(iii) Estimate from the following in NMR spectroscopy the $CH_3Cl$ compound having a chemical shift of

a) 2.16 b) 2.65
c) 4.26 d) 3.1

(iv) Select the useful information can be found from a Van Deemter plot?

a) The selectivity Factor. b) Optimum mobile phase flow rate.
c) Optimum column Temperature. d) Optimum column length.

(v) Select the Calibration of High performance liquid chromatography by which chemical?

a) Methanol. b) Acetonitrile.
c) Theophylline . d) Caffeine.

(vi) Select Troubleshoot of instrument checked by which all parameters?

a) Leakage. b) Lamp error.
c) Sampler error. d) All of these.

(vii) Choose the following in NMR spectroscopy the chemical nature of the _____ and spatial positions of _____

a) Nuclei, electrons b) Electrons, Protons
c) Neutrons, electrons d) Nuclei,neighbouring nuclei

(viii) In NMR spectroscopy, relate in which of the following must irradiate the spinning nuclei in strong magnetic field ?

a) Perpendicular and stronger field b) Parallel and stronger field
c) Parallel and weaker field d) Perpendicular and weaker field

(ix) Predict the Signal splitting in NMR arises from

a) Deshielding effect
b) Spin-Spin decoupling
c) Shielding effect
d) Spin-spin coupling

(x) Determine from the following, what is Eluent?

a) liquid use as a mobile phase
b) liquid use as a diluent
c) liquid as a waste
d) liquid as a spillage

(xi) Determine in which validation parameter the change in flow rate was observed

a) Accuracy
b) Robustness
c) Limit of detection
d) Precision

(xii) Choose During Calibration of Ultraviolet spectroscopy which parameters are used?

a) control of absorbance
b) limit of stray light
c) resolution power
d) all of these

(xiii) Memorize which gases are used in NMR spectroscoscopy

a) hydrogen, oxygen
b) neon, nigtrogen
c) helium, argon
d) helium, nitrogen

(xiv) Identify the NMR Spectroscopy the total nuclear spin becomes zero if the atomic mass and atomic number are

a) even, even
b) even, odd
c) odd, even
d) odd, odd

(xv) Select in NMR Spectroscopy the universally accepted reference is

a) DMF
b) DMSO
c) TMS
d) KBr

(xvi) Identify in solid phase extraction which solvent is used for conditioning?

a) Methanol, 10% methanol
b) NaCl, 10% NaCl
c) NaOH, 10% NaOH
d) HCL, 10% HCL

(xvii) Select the best one out during Calibration of Ultraviolet spectroscopy which parameters are used?

a) Control of Wave length.
b) Control of absorbance.
c) Limit of stray light.
d) All of these.

(xviii) 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.

(xix) Recall in Ultraviolet spectrophotoscopy Lambert law deals with?

a) pH of the solution.
b) Concentration of solution.
c) Appearance of solvent.
d) Thickness of cuvette.

(xx) Select the best one out during the control of absorbance which chemical is used?

a) Calcium dichromate.
b) Sodium dichromate.
c) Magnesium dichromate.
d) Potassium dichromate.

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## Group-B

(Short Answer Type Questions) 5 x 7=35

2. Define Spectroscopy. Name the types of mass analyzers. (5)
3. Explain in detail about principle and working of UV- Visible Spectrophotometer? (5)
4. Explain in detail about principle and working of Radio Immuno Assay? (5)
5. Explain the principle of Solid Phase extraction method. (5)
6. Explain the principle of Liquid-Liquid extraction method. (5)
7. Illustrate "Production of X-Ray" with a neat diagram. (5)

**OR**

Classify the different X-Ray diffraction methods. Write down the application of X-Ray diffraction method. (5)

8. Explain the factors affecting DTA curve? (5)

**OR**

Describe the applications of DTA. (5)

## Group-C

(Long Answer Type Questions) 10 x 2=20

9. Explain the methodology involved in the qualification of UV-VIS Spectrophotometer. (10)
10. Explain the validation parameter for bio analytical methods as per ICH guidelines. (10)

**OR**

Explain in detail about Liquid-liquid extraction technique? (10)

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