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2024

B.Pharm. 8th Semester End-Term Examination

ADVANCED INSTRUMENTATION TECHNIQUES (THEORY)

(New Regulation w.e.f. 2017-18)

Full Marks – 75 Time – Three hours

The figures in the margin indicate full marks for the questions.

GROUP – A

1. Answer the following (MCQ) : $(20 \times 1 = 20)$

(i) The relationship between minimum wavelength of X-radiation generated from a target metal and applied voltage is given by

(a) Bragg's equation (b) Moseley equation

(c) Illkovik equation (d) Duane-Hunt equation

(ii) Mass spectrophotometer separate the ions on the basis of which of the following?

(a) Mass to charge ratio (b) Mass

(c) Atomic weight (d) Molecular formula

(iii) Reference materials which are commonly employed as internal standard in NMR is

(a) TMS (b) TBS

(c) MTS (d) CDS

(iv) Solid phase extraction is used for _____ of analyte

(a) concentrating and purifying

(b) filtering

(c) separation

(d) none of all

[Turn over

(v) Chemical Shift is measured in term of

(a) Alpha value (b) Beta value

(c) Gamma value (d) Delta value

(vi) The highest m/z peak in the mass spectrum is called as

(a) Parent peak (b) Isotopic peak

(c) Fragment peak (d) Base peak

(vii) ICR guideline used for analytical method validation is

(a) Q2 (b) Q7

(c) Q8 (d) Q10

(viii) A peak corresponding to the ion of maximum abundance is called the _____

(a) Base peak (b) Metastable peak

(c) Ionic peak (d) All of none

(ix) In thermogravimetry graph is plotted between

(a) Mass vs temp or time

(b) Mass vs potential

(c) Mass vs volt

(d) Mass vs current

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(x) For analytical purpose, x–ray range from _____ to _____ .

(a) 0.5 to 2.0 A° (b) 0.6 to 2.0 A°

(c) 0.7 to 2.0 A° (d) 0.8 to 2.0 A°

(xi) In UTA, plot is created between

(a) ΔT vs Temperature (b) Time vs Temperature

(c) Energy vs time (d) ΔT vs Time

(xii) Which of the following cannot be utilized as an adsorbent in column adsorption chromatography

(a) Magnesium oxide

(b) Silica gel

(c) Activated alumina

(d) Potassium permanganate

(xiii) The volatile oil is analyzed by

(a) HPLC (b) GC

(c) TGA (d) DSC

(xiv) Theoretical plates are used to

(a) Estimate the efficiency of a colunm

(b) Determine the thickness of the stationary phase

(c) Measure the distribution of the analyte between mobile and stationary phases

(d) None of the above

(xv) There are many studies required to validate an analytical method. Which of the studies below is not required for method validation

(a) method specificity

(b) linearity

(c) range

(d) calibration

(e) limit of detection

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(xvi) The number of signals in an nmr spectrum tells the number of the _____ in a molecule

(a) sets of protons (b) sets of equal protons

(c) sets of equivalent protons (d) sets of electrons

(xvii) Paper chromatography is used for the

(a) Separation (b) Partition

(c) Retention (d) Identification

(xviii) Patent ion peak give information about

(a) Molecular weight (b) Equivalent weight

(c) Atomic weight (d) Atomic structure

(xix) Diffraction is also called as _____

(a) Reflection (b) scattering

(c) Refraction (d) none of all

(xx) What is the delta value of TMS in NMR?

(a) 0 (b) 10

(c) 5 (d) 7

GROUP – B

(Short Answer questions)

2. Answer any *seven* questions. (7 × 5 = 35)

(a) Write the Principles and applications NMR.

(b) Explain the Electron impact Ionization techniques in mass spectroscopy.

(c) Define validation. Enlist the different parameters used in method validation.

(d) Write a note on calibration of UV-Visible spectrophotometer.

(e) Write the application of Hyphenated techniques in phamnceutical industry.

(f) Discuss the principle of X–ray crystallography and its application.

(g) Write a short note on radio–immune assay (RIA).

(h) Write General principle and procedure involved in the solid phase extraction.

(i) Write about process and application of TGA.

GROUP – C

(Long Answer questions)

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3. Answer any *two* of the following : (2 × 10 = 20)

(a) Write the principle and instrumentation and application of Mass spectrophotometer.

(b) Define Calibration. Discuss the calibration of High performance liquid chromatography.

(c) Explain the following :

(i) Metastable ion.

(ii) Mc Lafferty rearrangement.

(iii) Chemical shift.