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BP 811 ET

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2022

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Wahat 75017

B.Pharm. 4th Year 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 × 1 = 20)
- (i) Chromatography is a physical method that is used to separate and analyse
- (a) Simple mixtures
 - (b) Complex mixtures
 - (c) Viscous mixtures
 - (d) Metals
- (ii) Beer's law states that the intensity of light decreases with respect to .
- (a) Concentration
 - (b) Distance
 - (c) Composition
 - (d) Volume
- (iii) Which of the following is not a type of Spectroscopy?
- (a) Gamma-ray
 - (b) X-ray
 - (c) Nuclear Magnetic Resonance (NMR)
 - (d) Sound

[Turn over

- (iv) 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
- (v) Which ratio does a mass detector estimate?
- (a) z/m
 - (b) e/m
 - (c) m/e
 - (d) m/z
- (vi) What is the purpose of mass spectroscopy?
- (a) Determination of molecule weight
 - (b) Elucidating the chemical structures of molecules
 - (c) (a) and (b)
 - (d) None of the above
- (vii) Which of the following solvent is not used in NMR?
- (a) D_2O
 - (b) $CHCl_3$
 - (c) CCl_4
 - (d) $CDCl_3$
- (viii) Chemical shift has the units of
- (a) Parts per million
 - (b) Parts per billion
 - (c) Tesla
 - (d) No units
- (ix) TGA used to measure _____.
- (a) Change in mass-loss of weight
 - (b) Change in temperature reaction
 - (c) Pressure
 - (d) (b) and (c)

- (x) HPLC is an abbreviation for
- (a) High-Profit Liquid Chromatography
 - (b) High-Pressure Liquid Chromatography
 - (c) Higher-Performance Low Chromatography
 - (d) Higher-Profit Low Chromatography
- (xi) In reverse phase chromatography, the stationary phase is made
- (a) Non-polar
 - (b) Polar
 - (c) Either non-polar or polar
 - (d) None of these
- (xii) RP-HPLC method contains
- (a) Stationary phase is polar, and mobile phase is non-Polar
 - (b) Stationary phase is non-polar, and mobile phase is polar
 - (c) Stationary phase is non-polar, and mobile, Phase is non-polar
 - (d) Stationary phase is polar, and mobile phase is polar
- (xiii) Which of the statements is correct?
- (a) Gas chromatography is used to analyse gases
 - (b) Gas chromatography is used to analyse solids
 - (c) Gas chromatography is used to analyse gases, solutions and solids
 - (d) All of the above
- (xiv) Theoretical plates are used to
- (a) Estimate the efficiency of a column
 - (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) Mass spectrometer separates ions on the basis of which of the following?
- (a) Mass
 - (b) Charge
 - (c) Molecular weight
 - (d) Mass to charge ratio

(xvi) ICH guideline is used for Analytical method validation

- (a) Q2
- (b) Q7
- (c) Q8
- (d) Q1A-Q1F

(xvii) The reference standard used, in NMR spectroscopy is

- (a) Tetramethyl silane
- (b) Benzene
- (c) Ethanol
- (d) C18 silica gel

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

- (a) Base peak
- (b) Fragment peak
- (c) Isotopic peak
- (d) Parent peak

(xix) IR spectroscopy generally used to determine

- (a) Molecular structure
- (b) Functional group
- (c) Number of protons
- (d) All of the above

(xx) TGA curve is a plot

- (a) Weight vs. temperature
- (b) Weight vs. volume of titrant
- (c) Weight vs. current
- (d) Weight loss vs. temperature

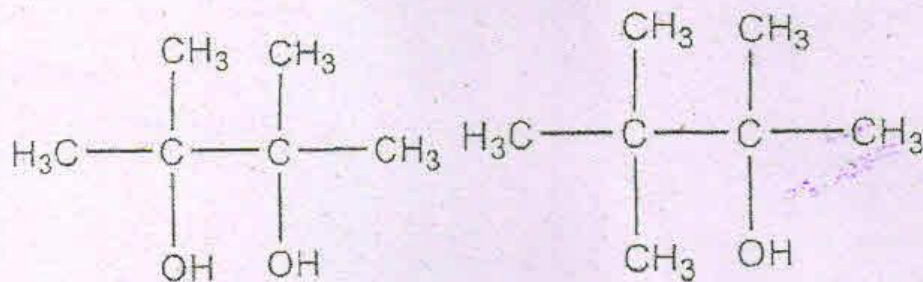
Group – B

(Short Answer questions)

2. Answer any seven questions.

(7 × 5 = 35)

- (a) Write down the principles and application of NMR spectroscopy.
- (b) Write a short note on Radio-immune assay (RIA).
- (c) How will you differentiate the following pair of compounds by NMR spectroscopy?



- (d) What is the difference between DSC and TGA?
- (e) Write a short note on gas chromatography (GC) validation.
- (f) Write briefly about hyphenated chromatographic techniques used in drug analysis.
- (g) Write a short note on ionization techniques used in mass spectrometry.
- (h) Discuss the principle of X-ray crystallography and its application.
- (i) What do you mean by DTA and mention its applications?

Group – C

(Long Answer questions)

3. Answer any two of the following.

(2 × 10 = 20)

- (a) (i) What is ICH guideline? (3+7)
- (ii) Briefly explain how can HPLC be calibrated and validated as per ICH and USFDA guidelines?