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## BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – B.Pharm-2020/B.Pharm-2021

Course Name – Instrumental Methods of Analysis - Theory/Instrumental Methods of Analysis

Course Code - BP701T

( Semester VII )

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 type of chromatographic technique, where 0.2mm thick layer of adsorbent is used as stationary phase.
  - a) Gas chromatography
  - b) Column chromatography
  - c) Thin layer chromatography
  - d) Paper chromatography
- (ii) Which wavelength range corresponds to UV-Visible region?
  - a) 400-800nm
  - b) 200-800nm
  - c) 200-400nm
  - d) 400-500nm
- (iii) Choose the Correct option, In UV-Vis spectroscopy what is the subject of detection for analytes
  - a) Absorbance
  - b) Transmission
  - c) Scattering
  - d) None of these
- (iv) Identify the correct option, the "shift of Wavelength in greater side" is known as \_\_\_\_\_.
  - a) Bathochromic Shift
  - b) Hypsochromic shift
  - c) Hyperchromic shift
  - d) None of these
- (v) determine that when molecules are excited in the visible region, which lamp is used?
  - a) Hydrogen deuterium lamp
  - b) Xenon lamp
  - c) Tungsten Lamp
  - d) Mercury Lamp
- (vi) Select the correct option, the modern UV sample cell or Cuvette is made up of \_\_\_\_\_.
  - a) Glass
  - b) Plastic
  - c) Quartz
  - d) Cobalt

- (vii) Predict that the intensity of a beam of monochromatic light decreases exponentially with increase in the concentration of absorbing species arithmetically which law applies in it?
- Beers Law
  - Lamberts Law
  - Both of these
  - None of these
- (viii) Predict the correct option in which one of the following is used as radiation source in fluorimetry.
- Xenon Arc Lamp
  - Mercury Vapor lamp
  - Tungsten lamp
  - All of these
- (ix) Identify the correct option, fluorescence intensity depends on all of the following except \_\_\_\_\_.
- Concentration
  - Polarity
  - Path length
  - Intensity of incident radiation
- (x) Choose the correct option, In IR what region is basically used for the detection of molecules?
- Fingerprint region
  - Functional group region
  - Both A & B
  - None of these
- (xi) Identify the over tones are mainly checked at \_\_\_\_\_.
- Near IR
  - Mid IR
  - Far IR
  - Not shown in IR region
- (xii) Choose the correct option, in AAS, for analyzing potassium (K<sup>+</sup>) the sample should be irradiated at what wavelength?
- 766.5 nm
  - 823.6 nm
  - 243.4 nm
  - None of these
- (xiii) Predict the testing of flame photometry on ignition of lithium we observe
- red
  - yellow
  - lime green
  - violet
- (xiv) Select the correct option, What does UV-Vis spectroscopy primarily measure?
- Mass of a sample
  - Absorption of ultraviolet and visible light by a sample
  - pH of a solution
  - Conductivity of a solution
- (xv) select the correct option, What is the purpose of using Beer-Lambert Law in UV-visible spectroscopy?
- To determine the wavelength of light
  - To calculate the molar absorptivity
  - To quantify the concentration of a sample
  - To analyze the electronic structure of molecules
- (xvi) Identify the correct option, thin layer chromatography works based on the principle of \_\_\_\_\_.
- Partition
  - Absorption
  - Solubility
  - None of these
- (xvii) Select the correct option, monochromator placed in IR at \_\_\_\_\_ position.
- Before the sample cell
  - After the sample cell
  - After the light source
  - Monochromator is not needed in IR
- (xviii) Select the correct answer, "Ring strain" in IR leads to \_\_\_\_\_.
- it increases the transmittance
  - it decreases the transmittance
  - It decreases the vibrational frequency
  - Both B & C
- (xix) Select the correct answer, "Overtone" is associated with \_\_\_\_\_ factor that affects the "Vibrational Frequency".
- Mechanical Coupling
  - Hydrogen bonding

- c) Fermi resonance  
 (xx) Select the Correct option, In normal phase HPLC solvent and column are \_\_\_\_\_.  
 a) non polar solvent/polar column  
 b) polar solvent/non-polar column  
 c) non polar solvent/non-polar column  
 d) any of these  
 d) None of these

### Group-B

(Short Answer Type Questions)

5 x 7=35

2. Describe briefly the principle of Atomic Absorption Spectroscopy (AAS). (5)
  3. Explain the process of thin layer chromatography. (5)
  4. Write a short note on the different columns used in gas chromatography. (5)
  5. Explain the factors affecting efficiency of column in chromatography? (5)
  6. Classify different types of sampling techniques used in IR spectroscopy? (5)
  7. Summarize the factors affecting turbidometry. (5)
- OR**
- Summarize the principle and mechanism of gel chromatography. (5)
  8. Write the applications of UV-Vis spectroscopy. (5)
- OR**
- compare and differentiate between titration and chromatography (5)

### Group-C

(Long Answer Type Questions)

10 x 2=20

9. Describe different factors affecting vibrational frequency and mention the application of IR spectroscopy. (10)
  10. Compare and differentiate paper chromatography and column chromatography in detail. (10)
- OR**
- Compare and differentiate between flame photometry and atomic absorption spectroscopy in detail. (10)

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