

St. Joseph's College of Arts & Science (Autonomous)

Cuddalore – 607001

QUESTION BANK

CLASS: I-BCD., SEMESTER-II

SUBJECT: ANALYTICAL CHEMISTRY

SUBJECT CODE: ACH202T

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UNIT-I

PURIFICATION TECHNIQUES

1. Steam distillation is a special type of ----- sensitive method.
a) Pressure b) Temperature c) Volume d) Viscosity
2. Fractional crystallization is based on their ----- property.
a) Solubility b) Viscosity c) Fluidity d) Sublimation
3. A substance which decomposes below its boiling point can be best purified by _____
a. Simple distillation b. Stem distillation c. Fractional distillation d. Distillation under reduced pressure
4. Naphthalene can be purified by
a. Crystallization b. Steam distillation c. Sublimation d. Fractional distillation
5. A mixture of acetone and methanol can be separated by _____ method.
6. Organic compounds are soluble in
a) Non-polar Solvents b) Polar solvents c) Water d) HCl
7. Decolourisation of coloured compounds can be effected by using
a) Animal charcoal b) Carbon c) Coke d) Infra-red rays

8. Compounds having boiling points widely apart 40 K and above can be purified by
a) Crystallisation b) Simple distillation c) Fractional distillation d) Sublimation
9. Nitrobenzene and benzene can be separated by the method of
a) Steam distillation b) Crystallisation c) Fractional crystallisation d) Chromatography
10. Purification of two miscible liquids possessing very close boiling points can be separated using
a) Fractional distillation b) Sublimation c) Simple distillation d) Steam distillation
11. Purification of mixture of compounds can be done by steam distillation only if the impurities are
a) Non-volatile b) Volatile c) Insoluble in Water d) both a & c
12. When the stationary phase is solid, then the compounds can be separated on the basis of
a) Adsorption b) Partition c) Both partition and adsorption d) Either

SECTION-B

1. What is Vacuum distillation?
2. What is Crystallisation?
3. Write the principle of crystallization.
4. What are the techniques used to purify the organic compounds?

SECTION- C

1. Explain steam distillation.
2. Write a note on fractional crystallization.
3. Illustrate the conditions for a good fractional distillation.
4. Explain the Purification of organic compounds by steam distillation.
5. Write the steps involved in crystallization technique.
6. explain experimental techniques of distillation techniques.
7. Explain crystallization process.

UNIT-II

SEPARATION TECHNIQUES

SECTION-A

1. The resulting differences in rates cause the components in a mixture to separate into bands or zones in ----- chromatography
 - a) Paper b) Gas c) Thin layer d) Column
2. A chromatogram is a plot of elution time versus-----
 - a) Solvent concentration b) Solute concentration c) Length d) Reaction time
3. The principle involved in paper chromatography is
 - a. Adsorption b. Partition c. Solubility d. Absorption
4. Chromatography can be used to
 - a. Separate mixtures into pure components b. Change mixture composition c. Form solids d. Mix the compounds
5. Column Chromatography is based on the principle of
 - a) Adsorption b) Partition c) Absorption d) Distribution
6. In Ascending paper Chromatography, the solvent moves
 - a) Upwards b) Downwards c) Horizontally d) None
7. The existence of wide range of organic compounds is due to their, property of
 - a) Extensive catenation b) Lower boiling points c) Polymerisation d) Isomerism
8. ----- is the transition of solid chemical into gaseous substance.
9. Chromatography technique possess _____ and _____ phases.

SECTION-B

1. Define Chromatography.
2. What is Retention factor in Chromatography?
3. What is eluant and eluate?
4. What is chromatography?
5. Define: R f value.

SECTION-C

1. Explain Ion exchange chromatography.
2. What are the applications of Column chromatography?
3. Discuss the TLC methodology.
4. Write the applications of chromatography.
5. Discuss the ion exchange chromatography technique.
6. Explain types of chromatography.

UNIT-III

INSTRUMENTAL ANALYSIS

SECTION-A

1. DME in polarography acts as a -----.
a) Cathode b) Anode c) Diode d) Electrode
2. ----- is an electrochemical technique which measures the current that develops in an electrochemical cell.
a) Spectroscopy b) Polarimetry c) Cyclic voltametry d) Colorimetry
3. A polarimeter is used to measure
a. Residual current b. Angle of rotation of light c. Wave number d. Wavelength
4. In voltametric technique the SCE refers to
a. Standard cathode electrode b. Standard calomel electrode c. Simple calorimetric electrode d. None of these
5. ----- is used for the diffusion of particles in polarography.
6. The working electrode in the polarography method is _____

SECTION-B

1. Draw the schematic diagram of Polarimeter.
2. Write Ilkovic equation with terminologies.
3. What is diffusion current?
4. What is the principle involved in polarography?
5. Define residual current.

SECTION-C

1. What are the advantages of DME?
2. What is the principle behind cyclic voltammetry?
3. What are the applications of Polarography?
4. Sketch the diagram of spectropolarimeter.
5. Discuss the application of Polarimetry method.
6. Explain the application of Cyclic Voltammetry method.
7. Explain polarimetry principle and instrumentation techniques,
8. Explain polarography techniques.

UNIT-IV

SPECTROSCOPY

SECTION-A

1. The region from 0.1mm to 1cm wavelength corresponds to changes in the rotation of molecules and is called ----- region,
a) Microwave b) Radiofrequency c) Infrared d) Near IR
2. During an electronic transition, a vibrating molecule does not change its -----
a) Internuclear distance b) Dipole moment c) Charge d) Energy
3. Wavelength having the symbol of

a. ρ b. σ c. \ddot{u} d. λ

4. The selection rule for anharmonic oscillator of vibrational spectra is

a. $\Delta\hat{U} = \pm 1$ b. $\Delta\hat{U} = \pm 2$ c. $\Delta\hat{U} = 0$ d. $\Delta\hat{U} = \pm 1, \pm 2, \pm 3, \dots$

5. Because of their characteristic absorptions identification of functional groups is easily accomplished easily by ----spectroscopy.

6. $R_f = \text{-----}$

7. The linear N-atomic molecule can have _____ fundamental vibrations.

SECTION-B

1. Define auxochrome with an example.

2. What is Bathochromic shift?

3. Define Chromophores.

4. Write note on rotational transition of molecules.

5. State Beer's law.

6. What is Bathochromic shift in UV spectroscopy?

7. Define electromagnetic radiation.

8. explain types of Spectroscopy.

SECTION-C

1. Explain Beer- Lambert's law.

2. Explain different types of vibrations of molecules.

3. Calculate the absorption maximum in the uv spectrum of 2,4 hexadiene.

4. Explain the selection rule for rotational spectroscopy

5. Explain the Woodward fieser rule for calculation of λ_{\max} value with examples.

6. Explain the Morse curve for electronic transition of diatomic molecules.

7. define selection rule.
8. Explain types of transitions in U-V spectroscopy.
9. Explain Woodward fieser rules.

UNIT-V
TECHNOLOGY OF WATER
SECTION-A

1. Water containing large quantities of dissolved salts of ----- is called hard water.
a) Calcium b) Magnesium c) Calcium&magnesium d) Potassium
2. ----- method reduces the salinity of blackish water
a) Reverse osmosis b) Coagulation c) Electrodialysis d) Lime soda process
3. EDTA means
a. Ethylenediamine tetra aceticacid b. Ethylenediaminotriaceticacid c. Ethylenediaminotrichloroaceticacid d. Ethyle diacetic triamine
4. Removal of dissolved solids from water is
a. Decantation b. Demineralization c. Desalination d. Crystallization
5. ----- of water is the removal of cations and anions of substances dissolved in it.
6. Zeolite is used for _____

SECTION-B

1. Classify water based on hardness.
2. What is desalination?
3. How do you eliminate the temporary hardness of water?

4. What are the ions responsible for permanent hardness of water?

SECTION-C

1. Write any four methods in determining hardness of water.
2. Explain estimation of hardness of water using EDTA method.
3. Write a note on temporary hardness.
4. Estimate the hardness of water by EDTA method.
5. Explain Reverse osmosis.
6. What is Desalination of water? Explain.
7. Explain Reverse osmosis, ion exchange, and zeolite method.