

ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE, (AUTONOMOUS)
CUDDALORE-1.
QUESTION BANK

CLASS : III- B.Sc., CHEMISTRY

SUBJECT : ANALYTICAL TECHNIQUES

SUBJECT CODE: ECH512

Unit-I

Objective type Questions

1. In IR, thermocouples are used as a _____
a) Source b) Detector c) Analyser d) Recorder
2. Molecules which are having _____ are microwave active.
a) Dipole moment b) High pressure Detector
c) Principle axis d) Acidity
3. Which of the following is not generally classified as Instrumental Method?
a) Spectroscopic techniques b) Electrochemical Techniques
c) Titrimetric analysis d) Chromatographic Techniques
4. Microwave spectroscopy is generally used to detect _____
a) Functional groups b) Double bonds c) Unpaired electrons d) Isotopes
5. _____ is designated as microwave region of electromagnetic spectrum.
a) $<50\mu\text{m}$ b) $1\mu\text{m}$ to 100cm c) $100\mu\text{m}$ to 1cm d) $>50\mu\text{m}$
6. In _____ instruments high pressure mercury Arc is generally employed
a) Far IR b) Near IR c) UV d) Microwave
7. _____ spectroscopy explores the part of the electromagnetic spectrum which extending from 100 to 1cm
a) IR b) Microwave c) Raman d) NMR
8. Molecules which are not having dipole moment are called microwave-_____
9. In IR spectroscopy the cuvette is made of _____
10. In _____ Instrument high pressure H_2 arc is generally employed

Short Answer

1. Draw the schematic diagram of single beam spectrophotometer.
2. Write about detectors in microwave spectroscopy.
3. Write about the sample in microwave spectroscopy.
4. What are the advantages of double beam spectrophotometer?
5. What is the condition for a molecule to be microwave active? Why?
6. Draw the Block diagram of a double beam spectrophotometer.
7. Why is oxygen molecule not microwave active?
8. Give any four sources of IR radiation.
9. What should not be the physical state of the sample for Microwave spectroscopy?
10. Draw neatly the optical path of a double beam IR spectrometer.
11. Write note on Golay cell in IR spectrometer.
12. Give the simplified diagram of microwave spectrometer.
13. Explain the instrumentation of spectrum analyser of microwave spectrometer.

DETAILED ANSWER

1. Explain 'Pellet' making in IR spectroscopy

2. Write a note on source and monochromator of microwave spectrometer.
3. Write about the requirements of IR radiation
4. Write a note on the thermistors used in IR spectroscopy.
5. Explain the different sampling techniques in IR spectroscopy.

UNIT –II

Objective type Questions

1. Source for Raman spectroscopy-----
2. Source for UV spectroscopy-----
3. Source for NMR-----
4. UV region-----
5. NMR region is -----
6. Stoke lines have ----- wavelength from incident radiation
7. AntiStoke lines have ----- wavelength from incident radiation
8. Dispersion elements in UV are-----
9. In UV sample cells are made of-----
10. Nuclear spin value is -----
11. Alkane are example for ----- transition
12. Alkene are example for ----- transition
13. Bathochromic shift with ----- wavelength
14. hypochromic shift with ----- wavelength
15. hypsochromic shift with -----wavelength
16. Nuclear spin for atom with atomic number and mass number are even-----
17. Which of the following is the conventional source of radiation for Raman spectroscopy
a) Tungsten Lamp b) Fluorescent Lamp c) Mercury discharge lamp d) LED
18. The sample holder for UV spectroscopy must be made of -----
a) Quartz b) Glass c) Plastic d) Rubber
19. The strong magnet selected for NMR must maintain----- magnetic field.
20. -----Magnets are suitable for NMR machines operating with the frequency 230HZ and above
21. The Raman effect is relatively weak, therefore it is essential to have a source of----- intensity
a) High b) Low c) Medium d) Weak
22. Photo voltaic cell can be used as a -----in UV spectrometer
a) Source b) Monochromator c) Detector d) Power supply
23. Aniline shows fluorescence in -----region
a) IR b) NMR c) UV d) Mass
24. The lines have wavelength greater than that of the incident wavelength are called-----
25. -----spectra are due to scattering of light by the vibrating molecules
a) Raman b) IR c) NMR d) UV
26. The lines having wavelength ----- that of the incident wavelength are called Stokes lines,
a) Equal to b) Smaller than c) Greater than d) Same
27. Barrier layer cell can be used as a -----in UV spectrometer.
28. -----Magnets are suitable for NMR machines operating with the frequency 230MHz and above

Short Answer

1. Write about the source of Raman spectroscopy.
2. Write about the source of UV spectroscopy.
3. Write about the source of NMR spectroscopy.
4. Write about filters in Raman spectroscopy.
5. Write about monochromators in UV spectroscopy.
6. Write about DETECTORS in UV spectroscopy.
7. What is a chemical shift in NMR?
8. Write about sample holder in NMR.
9. What is Sweep generator in NMR spectrometer.
10. Give the instrumentation of Filters in Raman spectroscopy.
11. What are the 2 methods of excitation of the sample in Raman spectroscopy.
12. What is the advantage of using photographic plate as detector in Raman spectroscopy.
13. What are the advantages of using laser in Raman spectroscopy.
14. Write a note on the working of microwave spectrometer.
15. What is the resonance frequency of a 400 MHz NMR machine

Detailed Answer

1. Explain the instrumentation of UV spectroscopy.
2. Explain the instrumentation of Raman spectroscopy.
3. Explain the instrumentation of NMR spectroscopy.
4. Write a note on the Rf receiver in NMR.
5. What are the function of rf receiver in NMR.
6. What are the triple functions of power supply in UV spectrometer.
7. Explain the preparation of the sample and sample holder in NMR spectroscopy

UNIT-III

1. Quadrupole nuclei have spin greater than -----
2. NQR means -----
3. ESR means -----
4. Source for ESR-----
5. Mass spectroscopy to find -----
6. ESR Spectra are given by -----
7. Ion source for mass spectroscopy is -----
8. The sources of radiation NQR spectroscopy is
 - a) Global
 - b) Rf oscillator
 - c) Calciumoxide
 - d) Deutrium
9. In mass spectroscopy one of the source of ionization is
 - a) Neutrons
 - b) Protons
 - c) Electrons
 - d) Positron
10. In ESR analysis the sample is kept in the
 - a) Resonant cavity
 - b) Crystal detector
 - c) Magnetic system
 - d) Oscilloscope
11. NMR spectra can be obtained only for
 - a) Solids
 - b) Liquids
 - c) Gaseous
 - d) Colloids
12. In ESR Spectroscopy..... acts as a source of radiation
13. In ESR spectroscopy the frequency of the monochromatic radiation is determined by the..... to klystron

14. NQR Spectra can be only obtained for
15. cell is used for thermodynamic studies in mass spectrometry
- a) Photogalvonic b) Photovoltaic c)Knudsen d)conductometric

SHORT ANSWER

1. Write about radiation source in ESR
2. Discuss the crystal detector in ESR
3. Write about magnetic system in ESR
4. Discuss the electrostatic accelerator system in mass spectroscopy.
5. Write about ion collector in mass spectroscopy
6. What is the advantage of using wave meter in ESR spectroscopy
7. Give the schematic diagram for the atomic absorption spectrophotometer
8. What type of molecule will be ESR active
9. Give the required characteristic of analyser in mass spectroscopy
10. What is the role of attenuators in ESR spectroscopy
11. What do the acronyms CIS and EIS stand for in mass spectroscopy
12. What is time of flight in mass spectroscopy
13. What are the components of source in ESR
14. Write a note on vaccum system in mass spectroscopy
15. What is chemical ionization in mass spectroscopy
16. What are the components of mass spectroscopy
17. Write a note on the ion collector in mass spectroscopy

DETAILED ANSWER

- 1.Explain the instrumentation of NQR spectroscopy.
2. Explain the instrumentation of mass spectroscopy.
3. Explain the instrumentation of ESR spectroscopy.
4. Give the requirements of the sample in NQR spectrometer

UNIT 4

OBJECTIVE TYPE OF QUESTIONS

1. The nature of radiation used in Mossbauer spectroscopy is
a) UV b)Beta radiation c) radiowaves d) gamma radiation
2. The approximate number of elements whose concentration can preferably be determined by flame photometry is
a)10 b)15 c)50 d)06

3. In atomic absorption spectroscopy the present in the sample affects the single the negotiable degree
 a) compound b) cation c) anion d)neutral
4. Rate of sample introduction depends on..... Of total consumptions
5. one of the type of burners used in flame photometry is
6. The energy of the gamma ray photon in Mossbauer spectroscopy is
 a) 10-150KeV b)150MeV c)20eV d) 100MeV
7. In flame photometry the flame temperature lies between
8. Only small drops reach flame in of AAS

SHORT ANSWERS

1. Define Nebulisation
2. Explain filter in flame photometry
3. What are the conditions for Mossbauer spectroscopy
4. Draw neatly the total consumption burner used in flame photometry
5. Write about detector in flame photometry
6. What are the roles of filters in flame photometry
7. Give the block diagram of lock amplifier of atomic absorption spectrometer
8. Explain the terms of vibrator and absorber in instrumentation of Mossbauer spectroscopy

DETAILED ANSWER

1. Explain briefly the principle of Mossbauer spectroscopy
2. Explain the sequence of events in the flame of flame photometer
3. What are the required functions of the flame in the flame photometer
4. How does chopper work in AAS
5. What are the functions of flame in flame photometry
6. What are the three functions of cathode lamp
7. How does chopper work in atomic absorption spectrometer

UNIT 5

OBJECTIVE TYPE OF QUESTIONS

1. Nephelometry measures the intensity of
 a) Transmitted light b) scattered light c)absorbed light d)refracted light
2. The source of exciting radiation in fluorimetry is
 a) Globar b) deuterium lamp c) hollow cathode lamp d) xenon arc lamp
3. In internal solution in PH meter for PH electrode is
4. In fluorimetry the..... filter is used to select UV radiation
5. In turbidimetry transmittance =.....

6. Phenolphthalein indicator is colourless below a PH of
a) 7.3 b)8.3 c)9,3 d)10,3
7. The spectro fluorimeter record
a) Only emission spectra b) absorption spectra c) excitation and emission spectra
d)excitation spectra
8. The internal reference electrode in pH meter is.....

SHORT ANSWER

1. Draw neatly the diagram of the glass electrode used to measure the PH and label the part
2. State whether the following statement is true or false
Nebuliser is used in nephelometry
3. Can the pH of a corrosive solution be measured by a glass electrode pH meter?
Why
4. Explain pH scale
5. Give the uses of nephelometry
6. What are the sources of turbidimetry
7. Differentiate the two types of pH meters
8. What are the recent sources of excitation in spectrofluorometers
9. What are the three functions of cathode lamp
10. State whether the following statement is true or false
Dissolved salts are estimated by turbidometry

DETAILED ANSWER

1. Explain briefly the working of a pH meter
2. Explain the principle of nephelometric analysis
3. Explain briefly instrumentation of fluorimeter
4. Explain fluorescence phenomenon
5. Explain the schematic diagram of turbidimeter
6. Explain the working of turbidometer
7. Explain direct reading type of pH meter