

## INSTRUMENTAL METHOD OF ANALYSIS VII SEM MODEL QUESTIONS

LONG ESSAYS		2x10=20 Marks
1.	<p>Describe and derive the equation for Beer's – Lambert's law. Add a note on deviations and limitations of beers law.</p> <p style="text-align: center;">OR</p> <p>Write a note on theory and applications of IR spectrophotometry. Explain different sampling techniques employed in IR spectroscopy.</p>	
2.	Describe in brief the principle, instrumentation and applications of gas chromatography.	
3.	<p>Explain the principle, instrumentation and applications of UV-Visible spectroscopy.</p> <p style="text-align: center;">OR</p> <p>What are the different vibrational modes of polyatomic molecules upon IR absorption? Write in brief on the various detectors used in IR Spectroscopy.</p>	
4.	Describe the principle, instrumentation and applications of HPLC.	
5.	<p>What are the essential components of a UV-Visible Spectrophotometer? Draw a diagrammatic sketch and explain the functions and working of each unit.</p> <p style="text-align: center;">OR</p> <p>Explain the theory involved in IR spectroscopy with brief outline of IR spectroscopy instrumentation.</p>	
6.	Explain the instrumentation of HPLC with neat diagram with more emphasis on pumps and detectors used.	
7.	<p>Explain in brief about monochromators and any two detectors used in UV spectroscopy.</p> <p style="text-align: center;">OR</p> <p>Explain the principle, instrumentation, sampling techniques and applications of IR spectroscopy.</p>	
8.	Describe Gas Chromatograph with a neat labelled diagram. Explain the type of GC columns, carrier gases and detectors used.	
9.	<p>Draw and explain with a neat label diagram of double beam UV spectrophotometer. Explain various spectrophometric titrations with suitable graphs.</p> <p style="text-align: center;">OR</p> <p>Explain the construction and working of flame emission spectrometry with neat labeled diagram and discuss the various types of interferences occurred in atomic spectroscopy.</p>	
10.	Describe in brief instrumentation of gas chromatography with neat labeled block diagram.	
11.	<p>State and derive the equation for Beer – Lambert's law. Give the reasons for deviation from law.</p> <p style="text-align: center;">OR</p> <p>Discuss the principle, theory of IR spectroscopy and give its applications.</p>	

12.	Write elaborately the principle, instrumentation and applications of Gas chromatography.
13.	Discuss in detail about the concept of EMR, energies in organic molecule and electronic transitions in UV-Visible spectroscopy. OR Draw a neat labelled instrumentation layout of IR spectrophotometer and explain the sample handling techniques in IR.
14.	Draw a neat schematic diagram of GC. Explain about columns and detectors used in GC..
15.	Draw a neat labelled diagram of double beam UV-Visible spectrophotometer and explain the working principle of monochromators and any two detectors. OR Describes the principle, working and instrumentation of AAS.
16.	Draw a neat schematic diagram of HPLC. Explain about pumps and detectors used in HPLC.
17.	Define & derive Beer and Lambert's law. Add a note on its deviations and limitations. OR Explain briefly the instrumentation of IR spectroscopy.
18.	Enlist the Detectors and sample injection techniques used in Gas Chromatography & explain in detail each of two.
19.	Explain the working of double beam UV-Visible spectrophotometer with the help of neat labelled diagram. OR Discuss the different sources of radiations & detectors used in IR spectroscopy.
20.	Discuss the different pumps & detectors used in HPLC.

<b>SHORT ESSAYS</b>		<b>7x5=35 Marks</b>
1.	<p>Define and distinguish between fluorescence and phosphorescence. Write the various factors affecting the phenomenon of fluorescence.</p> <p style="text-align: center;">OR</p> <p>Define Wavelength, Wavenumber, Frequency, Transmittance and Absorptivity?</p>	
2.	<p>Explain the instrumentation and working of atomic absorption spectroscopy.</p> <p style="text-align: center;">OR</p> <p>Define and classify chromatography with suitable examples.</p>	
3.	Explain the practical steps involved in TLC for separation of components.	
4.	Describe the practical steps involved in paper electrophoresis.	
5.	Explain the instrumentation of HPLC with block diagram.	
6.	What are ion exchange resins? Classify and explain the ideal properties of ion exchange resins.	
7.	Explain the principle and theory of gel chromatography.	
8.	<p>Write the statement and derive the equation for Beer ‘s – Lambert’s law.</p> <p style="text-align: center;">OR</p> <p>Explain in brief the effect of solvent on absorption UV-Visible radiation by the molecules.</p>	
9.	<p>Explain the instrumentation and working of flame emission spectrometry.</p> <p style="text-align: center;">OR</p> <p>Explain the various methods of preparation of TLC plates.</p>	
10.	Briefly explain the operational techniques of column chromatography.	
11.	Add a note on gel electrophoresis.	
12.	Explain the concept of plate theory and rate theory for increasing the efficiency of column in chromatography.	
13.	What are ion exchange resins and explain the operational techniques of ion exchange chromatography.	
14.	Write the practical steps involved in size exclusion chromatography gel chromatography.	
15.	<p>Explain the phenomenon of Fluorescence and Phosphorescence. Write the requirement of molecules to exhibit fluorescence.</p> <p style="text-align: center;">OR</p> <p>Explain in brief the various types of shifts occurs in UV-Visible spectroscopy.</p>	

16.	<p>Name the burners used in flame photometry and explain in detail any one.</p> <p style="text-align: center;">OR</p> <p>Write the advantages of TLC over paper chromatography.</p>
17.	Explain the factors affecting efficiency of column in chromatography.
18.	Define electrophoresis and explain the various factors affecting electrophoresis.
19.	Explain the principle and working of thermal conductivity and flame ionization detectors.
20.	Write the principle, techniques and applications of ion exchange chromatography.
21.	Discuss the principle, instrumentation and applications of affinity chromatography.
22.	<p>Discuss the working principle and construction of spectrofluorimeter.</p> <p style="text-align: center;">OR</p> <p>Explain the multiple component analysis of drugs by UV spectroscopy.</p>
23.	<p>What are Nephelometry and turbidometry? Write principle involved for the same.</p> <p style="text-align: center;">OR</p> <p>Enlist and explain the various development techniques in paper chromatography.</p>
24.	Explain the separation techniques involved in column chromatography.
25.	Give an account of gel electrophoresis with representation of neat diagram.
26.	Explain about the various detectors used in HPLC.
27.	Define and classify ion exchange resins and explain the manufacture of cation exchange resin and anion exchange resin.
28.	Explain the principle, theory and applications of gel chromatography.
29.	<p>What is Quenching? Enumerate the various factors which influence quenching effect.</p> <p style="text-align: center;">OR</p> <p>Define Wavelength, Bathochromic shift, Hypsochromic shift, Hyperchromic effect and Hypochromic effect.</p>
30.	<p>Describe the detectors of an IR spectrometer.</p> <p style="text-align: center;">OR</p> <p>Write the practical aspects of development techniques in paper chromatography.</p>
31.	Explain the packing method of adsorbent in column chromatography with their merits and demerits.

32.	What is zone electrophoresis? Explain any one in detail.
33.	Describe the pumps, sample injection techniques and applications of HPLC.
34.	Principle, classification and mechanism of ion exchange process in ion exchange chromatography.
35.	Principle, ligands used and applications of affinity chromatography.
36.	Enumerate and discuss the different factors that affect the intensity of fluorescence. OR Explain the single component and multi component analysis by UV spectrometry.
37.	Explain the principle and applications of Flame photometry with neat labelled diagram?  OR What is electrophoresis? Describe paper electrophoresis technique.
38.	Explain the experimental methodology involved in preparing TLC plates. Add a note on detection methods in TLC?
39.	Discuss different methods of preparation and elution techniques of column chromatography.
40.	Mention the detectors used in HPLC and explain in detail any two.
41.	Explain the principle and theory of gel chromatography.
42.	Explain affinity chromatography.
43.	Write a note on effects of solvents (solvatochromic effect) in UV spectroscopy. OR Discuss the factors affecting the fluorescence.
44.	Write the diagram of flame and explain the different regions.  OR Define electrophoresis. Discuss the factors affecting the electrophoresis.
45.	Discuss the development and visualization techniques in paper chromatography
46.	Explain the packing, elution and detection techniques involved in column chromatography.
47.	Write the construction and working of any two detectors used in HPLC.
48.	What is ion exchange chromatography? Give the steps involved in the mechanism of ion

	exchangers used.
49.	Discuss the principle involved in separations by gel chromatography.
50.	Draw a neat schematic diagram of fluorimeter. Why the light source and detectors are placed perpendicular to each other and two monochromator used in fluorimeter. OR Write a note on effects of solvents (solvatochromic effect) in UV spectroscopy.
51.	Explain the construction and working of Golay cell and bolometer detectors used in IR Spectroscopy. OR Discuss the development and visualization techniques in paper chromatography.
52.	Explain the experimental methodology involved in paper electrophoresis and its applications.
53.	Discuss the preparation, activation and visualisation of TLC.
54.	Draw a neat schematic diagram of GC. Explain about columns used in GC.
55.	Write a note on affinity chromatography with special emphasis on ligands used.
56.	Write a note on cationic and anionic exchangers.
57.	Explain the construction & working of photomultiplier tube and barrier layer cell. OR Discuss the single component & multi component analysis by UV spectroscopy.
58.	Discuss the principle and various gels used in gel chromatography. OR Discuss the principle & applications of Flame photometry.
59.	What is adsorption and partition column chromatography. Give its advantages and disadvantages.
60.	Discuss the applications of HPLC.
61.	Define and classify Ion Exchange resins. Add a note on factors affecting Ion exchange.
62.	Discuss the different development techniques used in Paper Chromatography.
63.	Explain the principle and techniques involved in Paper Electrophoresis.
64.	Discuss the UV method for analysis of single component and multi component formulations. OR Discuss the principle of fluorescence using Jablonski diagram

65.	<p>Explain the principle and interferences in Atomic spectroscopy.</p> <p style="text-align: center;">OR</p> <p>Discuss briefly rate and plate theory.</p>
66.	Write the different methods for preparations of TLC plates.
67.	Define Electrophoresis & discuss the factors affecting Electrophoretic mobility.
68.	Write the principle and mechanism of Ion Exchange Chromatography.
69.	Write the theory & applications of Affinity Chromatography.
70.	Discuss the classification of chromatographic methods based on mechanism of separation.

<b>SHORT ANSWERS</b>		<b>10x2=20 Marks</b>
1.	Mention in brief the importance of multi component analysis.	
2.	Define chromophore and auxochrome with suitable examples.	
3.	Name the fuel gases used in flame emission spectroscopy.	
4.	Write the vibrational frequency of alcohol, carboxyl group and amide.	
5.	Write the differences between nephelometry and turbidimetry.	
6.	What are the elution techniques in column chromatography.	
7.	Define $R_f$ and $R_m$ value with their significances.	
8.	What is Guard column? Write its significance.	
9.	What is the role of ligand in chromatography?	
10.	Write the applications of affinity chromatography.	
11.	Define Fluorescence and Phosphorescence.	
12.	Write the importance of color wheel.	
13.	Write the vibrational frequency of alcohol, aldehyde and amide in IR spectrum	
14.	Write the block diagram of Nephelometry.	
15.	What are different interferences in flame photometry?	
16.	Define $R_f$ and $R_m$ value.	
17.	What is electrophoresis?	
18.	What is programmed temperature gas chromatography? Write its importance	
19.	Give the example for anion and cation exchange resins.	
20.	Write the principle of affinity chromatography.	
21.	Define and classify filters and monochromators.	
22.	Mention the various methods of single component analysis.	
23.	Write the vibrational frequency of amide, amine and ketone in IR spectrum.	

24.	Write the applications of Atomic Absorption spectroscopy.
25.	Name the radiation sources used in IR spectroscopy.
26.	What is activation of plates? Write its importance.
27.	What is frontal and displacement analysis?
28.	What is derivatization in GC and write its significance.
29.	Mention the factors affecting ion exchange chromatography.
30.	Name the natural and synthetic gels used in gel chromatography.
31.	Define Absorptivity and Transmittance.
32.	What is Quenching? Give example.
33.	What are the events that occur when the compound of a metal to be investigated is aspirated into a flame?
34.	Define a) functional group region b) finger print region.
35.	Write the formula used to calculate number of fundamental vibration for Linear and Nonlinear molecules.
36.	Write the difference between normal phase and reverse phase chromatography.
37.	Write the difference of silica gel, Silica gel G, silica gel GF.
38.	What is derivatization? Mention the various methods of derivatization in gas chromatography.
39.	Write the difference between gel chromatography and affinity chromatography.
40.	Importance of ligand in affinity chromatography.
41.	What is molar extinction co-efficient?
42.	Enlist the application of fluorimetry in quantitative analysis of drugs.
43.	Write the vibrational frequency of C=O, OH, amine and amide.
44.	Write the application of nephelometry and turbidometry.
45.	Differences between flame emission and atomic absorption spectroscopy.
46.	What is two dimensional paper chromatography?

47.	Classify adsorbents and detecting reagents with examples.
48.	What is programmed temperature gas chromatography.
49.	What are the gels used in gel chromatography.
50.	Write the difference between gel chromatography and gel electrophoresis.
51.	Define chromophore and auxochrome.
52.	What is absorption maxima? Write its significance?
53.	Write the wavenumber of OH group and NH <sub>2</sub> groups in IR spectrum.
54.	Write the difference between nephelometry and turbidimetry.
55.	How solid samples are handled into IR spectrometers.
56.	What is the difference between Silica gel H, Silica Gel G and Silica gel GF?
57.	Classify detecting reagents in paper chromatography with suitable examples.
58.	What is Guard column? Write its significance.
59.	Mention the various factors affecting ion exchange chromatography.
60.	Write the applications of gel chromatography.
61.	Define the term absorptivity and wave number.
62.	Write the difference between fluorescence and phosphorescence.
63.	What is the functional group for wavenumber 3400 cm <sup>-1</sup> and 1715 cm <sup>-1</sup>
64.	Write the difference between nephelometry and turbidimetry.
65.	Define the term retention factor (Rf).
66.	Differentiate between normal phase & reverse phase chromatography.
67.	Write the expansions of Silica gel 60 GF 254.
68.	Explain any one derivatisation technique in GC.
69.	Why the buffers are used in ion exchange chromatography.
70.	What is the principle involved affinity chromatography?

71.	Define chromophore and lambda max.
72.	Define molar absorptivity.
73.	Explain the various frequency regions for amides and ketones.
74.	Mention the types of interferences in Atomic spectroscopy.
75.	Write the applications of nepheloturbidometry.
76.	What is the difference between isocratic and gradient elution in chromatography?
77.	Define edge effect? Mention the method to prevent.
78.	Mention the importance of guard column in GC?
79.	Name the stationary phase used in gel chromatography.
80.	Enumerate the applications of affinity chromatography.
81.	Define chromophore and auxochrome? Give one example for each.
82.	Solvent effect on UV absorption spectra.
83.	Write the vibrational frequencies of alcohols and amines in IR spectroscopy.
84.	Write the principle involved in nepheloturbidometry.
85.	What is temperature programming in gas chromatography.
86.	Define Rf value? Name the factors that affect Rf value.
87.	What is regeneration of ion exchange resins.
88.	What is affinity chromatography?
89.	Name the molecular vibrations in IR spectroscopy.
90.	What is edge effect? How to minimize it.
91.	Name the spectral shifts that occur in UV region.
92.	What is fingerprint region in IR spectroscopy.
93.	Name the electronic transitions that occur in UV region.
94.	Give any two applications of Nepheloturbidometry

95.	Name the different migration parameters used in planar Chromatography.
96.	Write the principle involved in Gel Chromatography.
97.	Write the properties of ideal Ion exchange resins.
98.	What is derivatization in Gas Chromatography?
99.	How aldehyde and ketone can be differentiated in IR spectrum.
100.	What is Normal phase & Reverse phase Chromatography?

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