Q.P. Code: 34857

Duration: 3 Hours Total marks 70

N.B (1) All questions are compulsory
(2) Figures to the right indicate full marks
(3) Answer all sub questions together
(4) Draw neat labeled diagrams wherever necessary

Q.1	A)	Answer the following (any SEVEN)	07M
	i.	Name two excitation sources used in Atomic Emission Spectroscopy	
	ii.	Give the approximate wavenumbers for fundamental absorption band of nitrile and hydroxyl group.	
	iii.	Define Absorbance	
	iv.	Name any one material transparent to IR radiation.	
	v.	Name two types of filters used in colorimeter	
	vi.	Define the unit Curie used in radiochemistry	
	vii.	Calculate the absorbance of solution giving transmittance of 10 %	
	viii.	Define the term absorption spectrum	
Q.1	B)	Answer the following (any FOUR)	08M
	i.	Explain the terms excited singlet and excited triplet state	
	ii.	What is wavelength maxima? How is it determined?	
	iii.	Fluorimetric analysis is more specific as compared to UV Visible spectroscopic analysis.State whether true or false. Justify your answer.	
	iv.	What are spectral interferences in Atomic Absorption Spectroscopy?	
	v.	What is α decay and β decay?	
Q2	A)	Answer the following (any TWO)	08M
	i.	What role does a wavelength selector play in a UV-Visible spectrophotometer? Enlist types of monochromators. With the help of suitable diagram explain working of any one monochromator.	
	ii.	Draw a neat labelled diagram of X-ray diffractometer. Discuss its working.	
	iii.	Give four points of differences between IR and Raman spectroscopy. Draw a labelled, block diagram of Raman spectrophotometer.	
Q2	B)	Explain the terms radiochemical and radionucleidic purity. How are they determined?	03M
Q3	A)	Answer the following (any TWO)	08M
	i.	What are thermal methods of analysis? With the help of an example discuss TG curve.	
	ii.	Give two advantages of FTIR over dispersive IR spectrophotometer. Draw a diagram of Michelson's Interferometer and describe its working.	
	iii.	Differentiate between AAS and AES based on the principle involved .Give one advantage , one disadvantage and one application of AAS	
Q3	B)	Enlist three factors influencing vibrational frequencies in IR spectroscopy with examples.	03M

Q4 A) Answer the following (any TWO) 08M

i. Derive Beer Lambert's law. Give its limitations.

ii. In a spectrophotometric assay following results were obtained. Perform linear regression to determine slope and intercept of calibration line with the data

Concentration of analyte(µg/ml)	Absorbance at λmax
5	0.17
10	0.31
15	0.50
20	0.72
25	0.91

iii. In standardization of 0.1 N NaOH, burette readings obtained were as follows

Day 1	15.6	15.5	15.7	15.9	15.3
Day2	15.3	15.5	15.4	16	-

Are the mean burette readings on the two days significantly different from each other at 5%? (Tabulated 't value' is 2.365)

Q4 B) Distinguish between DSC and DTA with reference to principle involved, instrumentation and applications 03M

Q5 A) Answer the following (any TWO) 08M

i. With the help of an energy level diagram describe the excitation and relaxation processes involved in fluorescence spectroscopy.

ii. Explain fundamental bands and overtones with reference to IR spectroscopy with suitable diagram. Give one pharmaceutical application of Near IR spectroscopy.

iii. Enlist methods for analysis of single component using UV-Visible spectroscopy. Discuss any one method in detail.

Q5 B) Derive Bragg's Law for X ray diffraction. 03M

Q6 A) Answer the following (any two) 08M

i. Discuss the UV spectrophotometric method for determination of equillibria constant

ii. Draw block diagram of Spectroflourimeter. Explain role of each of its components in brief.

iii. Enlist reflectance methods in IR spectroscopy. Explain any one in detail.

Q6 B) Absorbance of 15 µg/ml solution of drug X (Molecular weight 204) in a 1 cm pathlength cell at its λmax was found to be 0.76. Calculate its molar absorptivity 03M

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