



WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

CEMADSE02T-CHEMISTRY (DSE1/2)

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks. Candidates should answer in their own words and adhere to the word limit as practicable. All symbols are of usual significance.

Answer three questions taking one from each unit

UNIT-I

1.	(a)	Define accuracy and precision.	3
	(b)	Calculate the mean and the standard deviation of the following set of analytical results 15.67g, 15.69g and 16.03g.	2
	(c)	What is the basic principle of mole ratio method for determining stoichiometry of metal ligand complexes?	3
	(d)	What are the advantages of a double beam spectrophotometer over a single beam spectrophotometer?	3
	(e)	Differentiate between total consumption burner and premix chamber burner.	3
	(f)	What is the use of chopper in AAS?	2
2.	(a)	Good precision does not guarantee accuracy — Explain.	2
	(b)	What do you mean by 'systematic error' and 'random error'?	2
	(c)	What is the role of flame in atomic absorption spectrometry? Mention two fuel-oxidant gas mixture used for producing flame in atomic absorption spectrometer.	2+2
	(d)	What is the function of monochromator used in various spectrophotometer?	2
	(e)	Which is the most common light source used in atomic absorption spectrometer?	1
	(f)	Describe the structure of a hollow cathode lamp used as a source of Atomic Absorption Spectroscopy.	2
	(g)	What is the main difference between Flame Emission Spectrometry and Atomic Absorption Spectroscopy?	1
	(h)	What are the methods of removal of chemical interferences in AAS?	2

CBCS/B.Sc./Hons./5th Sem./CEMADSE02T/2020, held in 2021

UNIT-II

What is thermogravimetric analysis? Describe the different steps in thermogravimetric analysis of calcium oxalate monohydrate.	2+2
What are the basic requirements of a reference electrode in potentiometric measurements?	2
Mention two errors that affect pH measurements with glass electrodes.	2
What is liquid junction potential? How can we minimize the liquid junction potential?	2+2
What type of information can be obtained from thermogravimetric analysis? What are the main components of TGA apparatus? Discuss.	2+2
What are the indicator electrode and reference electrode in a typical pH measuring cell? Describe the basic constituents of the indicator electrode.	2+2
Discuss the nature of curve for the conductometric titration of a mixture of acetic acid and hydrocholoric acid by sodium hydroxide. What is dilution effect and mention steps taken to avoid the same.	2+2
UNIT-III	
	 What is thermogravimetric analysis? Describe the different steps in thermogravimetric analysis of calcium oxalate monohydrate. What are the basic requirements of a reference electrode in potentiometric measurements? Mention two errors that affect pH measurements with glass electrodes. What is liquid junction potential? How can we minimize the liquid junction potential? What type of information can be obtained from thermogravimetric analysis? What are the main components of TGA apparatus? Discuss. What are the indicator electrode and reference electrode in a typical pH measuring cell? Describe the basic constituents of the indicator electrode. Discuss the nature of curve for the conductometric titration of a mixture of acetic acid and hydrocholoric acid by sodium hydroxide. What is dilution effect and mention steps taken to avoid the same.

5.	(a)	How can you classify chromatographic techniques on the basis of the type of equilibrium process involved? Give examples of each type.	2
	(b)	What do you mean by ' R_f value'? What are the maximum and minimum R_f values possible? Justify your answer.	2+2
	(c)	Why masking agents are used in solvent extraction by chelation process?	2
	(d)	What is HPLC? Discuss.	2
	(e)	Why in solvent extraction distribution ratio is more meaningful term than distribution coefficient?	2
6.	(a)	Define stationary phase and mobile phase in chromatography.	2
	(b)	What is partition coefficient of a solute in chromatography?	2
	(c)	Name the basic components of gas chromatography instrument. Which gases are used as carrier gases?	3
	(d)	R_f values of three amino acids X, Y and Z are 0.14, 0.38 and 0.72 respectively. Which one of these amino acids in their TLC separation will occur on the top and which one at the bottom? Explain your choice.	2
	(e)	Explain in detail the mechanism of extraction by solvation process.	3

N.B.: Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

-×---