STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted from the academic year 2023 – 2024 and thereafter)

B.Sc. DEGREE EXAMINATION, APRIL 2024
BRANCH - CHEMISTRY
SECOND SEMESTER

COURSE: **MAJOR CORE**
PAPER: **ANAYTICAL CHEMISTRY**
SUBJECT CODE: **23CH/MC/AC23**
TIME: 3 HOURS **MAX. MARKS: 100**

Q. No.	SECTION A (15 x 1 = 15marks)	CO	KL
1	Identify the primary standard from the following a. NaOH b. HCl c. $K_2Cr_2O_7$ d. $Na_2S_2O_3$	1	K1
2	Which one among the following is a dimensionless quantity? a. Normality b. mole fraction c. molality d. none of these	1	K1
3	The SI unit of "amount of substance" is a. gram b. kilogram c. equivalent d. mole	1	K1
4	Identify the basic SI unit from the following a. ampere b. coulomb c. ohm d. volt	1	K1
5	The type of error caused by many uncontrollable variables which are inevitable part of every physical or chemical measurement is called _____ . a. systematic error b. determinate error c. random error d. instrumental error	1	K1
6	Precision of the results of replicate measurements can be expressed using a. range b. standard deviation c. coefficient of variation d. all of these	1	K1
7	The number of significant figures in the measured value of 4.380×10^{-8} m is _____. a. 1 b. 2 c. 3 d. 4	1	K1
8	Which among the following is incorrect with regard to primary standard? a. very pure b. gain or lose mass when exposed to the air c. have a relatively high molar mass d. react rapidly and stoichiometrically with the analyte	1	K1

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9	In TLC, _____ is used as the locating agent to identify the amino acid spots. a. Ninhydrin b. $KMnO_4$ c. H_2SO_4 d. Iodine	1	K1
10	The undesirable characteristic of the solvent used in solvent extraction is a. a high distribution ratio for the solute b. a high distribution ratio for the impurity c. easy recovery of solute from the solvent d. low toxicity and inflammability	1	K1
11	The volume of 0.1 M H_2SO_4 required to neutralize 50 ml of 0.2 M KOH is a. 20 ml b. 25 ml c. 30 ml d. 50 ml	1	K1
12	The mass of HNO_3 present in 500 ml of a 5 M solution is a. 5 g b. 31.5 g c. 63 g d. 157.5 g	1	K1
13	Identify the thermal technique where an inert reference material is used during the analysis a. DTA b. DTG c. both a and b d. Thermometric titration	1	K1
14	The presence of exothermic peak in the DTA thermogram of $CaC_2O_4.H_2O$, recorded in aerial atmosphere, arises due to a. loss of water of hydration b. decomposition of $CaCO_3$ c. decomposition of CaO d. exothermic burning of CO in air	1	K1
15	In the titration of borax versus HCl, the indicator used is a. phenolphthalein b. methyl orange c. methyl red d. Thymol blue	1	K1

Q. No.	SECTION B (15 x 1=15marks)	CO	KL
16	The SI unit of weight is _____.	**2**	**K2**
17	_____ of the sample is a measure of "quantity of matter" present in it.	**2**	**K2**
18	The normality of 0.05 M H_2SO_4 is _____.	**2**	**K2**
19	1 mole of $K_2Cr_2O_7$ will oxidize _____ moles of Fe^{2+} ions.	**2**	**K2**
20	$Na_2S_2O_3$ will act as a _____ agent.	**2**	**K2**
21	The standard solution of a _____ can be prepared by weighing and dissolving in a solvent to a known volume.	**2**	**K2**
22	_____ is used to compare the precision of two sets of data.	**2**	**K2**

23	The square of the standard deviation is called_____ .	**2**	**K2**
24	The measured quantity of 0.0026 g has _____ significant figures.	**2**	**K2**
25	_____ is the difference between the observed value and the true value of the quantity measured.	**2**	**K2**
26	α-alumina is used as a _____ in DTA analysis.	**2**	**K2**
27	Eriochrome Black T is the most commonly used indicator in _____ titrations.	**2**	**K2**
28	Boric acid can be estimated using standard NaOH by _____ method	**2**	**K2**
29	_____ is the stationary phase in paper chromatography	**2**	**K2**
30	The concentrations of very dilute solutions are expressed in _____units	**2**	**K2**

Q. No.	**SECTION C (6 x 5 = 30 marks)** **Answer any six questions**	**CO**	**KL**
31	Soda lime is 85% NaOH and 15% CaO by w/w. What volume of 0.25 M sulphuric acid is needed to neutralize 2.5 g of soda lime?	**3**	**K3**
32	Define R_f value and explain the various factors affecting it.	**3**	**K3**
33	Write a brief account on various sampling techniques used in chemical analysis.	**3**	**K3**
34	Explain the principle of Soxhlet extraction with a neat diagram.	**3**	**K3**
35	Discuss the principle of thin layer chromatography and mention its applications.	**3**	**K3**
36	Explain the various factors affecting the nature of thermogram.	**3**	**K3**
37	Explain the principle involved in the estimation of chloride by Fajans' method.	**3**	**K3**

Q. No.	**SECTION D(4 x 5=20marks)** **Answer any four questions)**	**CO**	**KL**
38	Calculate the mass of NaOH required for the complete neutralization of 4g of HNO_3.	**4**	**K4**
39	Distinguish between determinate and indeterminate errors.	**4**	**K4**
40	Write a brief account on the various factors affecting solvent extraction.	**4**	**K4**
41	Elaborate the procedure for the calibration of pipette.	**4**	**K4**
42	Explain the TGA and DTA thermograms of calcium oxalate monohydrate.	**4**	**K4**

Q. No.	SECTION E (2 x 10=20 marks) Answer any two questions	CO	KL
43	a. Write a note on the principle and importance of least square method in data analysis (6) b. Distinguish between precision and accuracy of a set of replicate measurements. (4)	**5**	**K5**
44	Explain the principle involved in the method of separation of mixtures by column chromatographic technique and mention its applications.	**5**	**K5**
45	With a neat diagram, explain the experimental setup used in thermo gravimetric analysis.	**5**	**K5**
46	Explain the principle of thermometric titrations and discuss its applications.	**5**	**K5**