BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MSc/IMSc/Pre_PhD **SEMESTER : VIII/ II/ PrePhD**
BRANCH: Chemistry **SESSION : SP/2024**

SUBJECT: CH412 ANALYTICAL CHEMISTRY

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Compare and contrast *population* and *sample* standard deviation with relevant mathematical expressions. Which among the two is (a) more accurate (b) more practical.	[5]	1	2
Q.1(b)	Outline the concept of *sample spiking technique* of third-party inspection. Elaborate with example of your choice.	[5]	1	3
Q.2(a)	Compare and contrast tubular column and capillary column of GC. Highlight their advantages and disadvantages.	[5]	2	2
Q.2(b)	Explain with clear illustration the concept of 2D TLC. What is its advantage over normal TLC?	[5]	2	2
Q.3(a)	Outline the *Volhard's method* of estimation of chloride in a given sample solution. Discuss the importance of chloride estimation in industrial waters.	[5]	3	2
Q.3(b)	Outline the gravimetric estimation of calcium in water samples. Discuss in details the chemistry behind the estimation method.	[5]	3	2
Q.4(a)	Draw a TGA curve for Calcium oxalate or any other salt and discuss its interpretation?	[5]	4	2
Q.4(b)	Classify the types of thermal analysis, discuss the role of DSC, TGA and DTA giving any one example each?	[5]	4	2
Q.5(a)	Outline the Potentiometric-Argentometric estimation of chlorides in a given water sample. Draw all the relevant schematics and chemical equations.	[5]	4	2
Q.5(b)	Discuss the various types of 'single electrodes'. Elaborate the application of metal-sparingly soluble salt type single electrode as reference electrode.	[5]	4	2

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