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

CLASS: MSc. **SEMESTER : II**
BRANCH: Chemistry **SESSION : SP/2025**

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)	A saturated solution of salicylic acid in methanol contains 64 kg salicylic acid per 100 kg methanol at 298 K (25^0c). Find (a) Weight % and (b) mole % compositions of the solution?	[5]	1	1,2
Q.1(b)	The volumetric flow rate of kerosene in an 80 mm nominal diameter pipe is Imperial gallons per minute. Taking the density of kerosene as 0.8 kg/dm^3, find the mass flow in kg/s	[5]	1	1,2
Q.2(a)	Discuss the principle, instrumentation and applications of ion exchange chromatography. How Gel permeation chromatography is helpful in analysis?	[5]	2	2,3
Q.2(b)	What are the different types of extraction techniques available? Discuss any two examples where they are useful in analysis of environmental/biomedical samples?	[5]	2	2,3
Q.3(a)	Classify the different kind of titrations? Explain with any one type of titration technique the challenges encountered and applications associated with them?	[5]	2,3	3
Q.3(b)	Classify the different types of gravimetric analysis techniques and elaborate any one of them with respect to applications?	[5]	2,3	3
Q.4(a)	Classify the different thermoanalytical techniques and specify the applications for each of them? Give a schematic diagram of thermocouple and its use in measurement?	[5]	3,4	4
Q.4(b)	Draw a thermogram for $CuSO_4.5H_20$ or any other material of your choice for thermogravimetric analysis and interpret it for explanation.	[5]	3,4	4
Q.5(a)	Explain the apparatus required for measurement of conductance. Discuss any one application of conductometry?	[5]	4	5
Q.5(b)	Explain the significance and applications of conductometric titrations?	[5]	4	5

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