[Time: 2 ½ Hours] **[Marks:60]**

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.

2. Figures to the right indicate full marks.

1. A. Attempt ANY TWO of the following : **08**

i. Explain the method validation of analytical processes

ii. Write a detailed note on 'Pre-treatment of soil sample'.

iii. What can be the reasons for incorrect analytical results? How can they be corrected?

iv. Describe the factors to consider while selecting a method.

B. Attempt ANY ONE of the following : **04**

i. Define: a) Representative sample b) Systematic sampling
c) Random sampling d) Bulk material for sampling.

ii. Explain subsampling and storage of samples.

2. A. Attempt ANY TWO of the following : **08**

i. Describe the software methods for noise reduction.

ii. Explain the term Noise Justify the importance of enhancing signal to noise ratio (S/N) in chemical analysis.

iii. Explain the term 'Drug Rules' (drug schedule).

iv. Write a note on significance of GLP in analytical labs.

B. Attempt ANY ONE of the following: **04**

i. Three measurements and their uncertainties are as follows:
Measurement : a= 11.38, b=9.89, c=10.29
Uncertainties : a=0.012, b=0.011 c=0.008
If the final measurement is of type Y=a +b +c, calculate the combined uncertainty in the measurement of Y

ii. The following data were obtained for a voltage measurement in mv, on a noisy system: **04**
1.37, 1.84, 1.35, 1.47, 1.10, 1.73, 1.54, 1.08 Assuming that the noise is random, calculate the S/N ratio of the system?

Q.3 A. Attempt ANY TWO of the following: **08**

i. Give an account of use of chelating resin for separation of inorganic and organic compounds.

ii. Explain the terms breakthrough capacity of resin and ion exchange equilibria.

iii. Write a note on Exclusion Chromatography.

iv. What are 'Inorganic molecular sieves? Explain their use.

B. Attempt ANY ONE of the following: **04**

i. Explain the instrumentation of ion Chromatography with special reference to suppressor column.

ii. Calculate the amount of calcium and sodium retained up by 4.150g of cation exchange resin with an exchange capacity of 3.750 m mol/g of resin (At wt of Ca = 40 and Na= 23)

Q.4 A. Attempt ANY TWO of the following: **08**

i. Write a note on types of supercritical fluids.

ii. Draw a schematic diagram of the set up in OPLC and explain its working.

iii. Enlist the applications of supercritical chromatography in environmental, and pharmaceutical analysis.

iv. Explain the critical and super critical state of the matter.

B. Attempt ANY ONE of the following : **04**

i. Explain the instrumentation of Affinity Chromatography.

ii. Draw a schematic diagram of the set up used in the super critical fluid chromatography.

Q.5 Attempt ANY **FOUR** of the following : **12**

i. Explain quality of sample.

ii. Elaborate the sources of methods of analysis.

iii. Give a brief account of Flicker noise.

iv. What is uncertainty? How is it evaluated?

v. Explain Inorganic ion exchangers with suitable example.

vi. Describe the instrumental method for determination of molecular weight of polymer.

vii. Enlist the applications of OPLC.

viii. State the applications of Affinity chromatography.

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