

[Time: $2\frac{1}{2}$ 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.

- Q. 1** A) Attempt **ANY TWO** of the following: (08)
- i) Define sampling. Write a note on sampling plan.
 - ii) Explain the term sub sampling. Discuss the precautions to be taken for storage of samples.
 - iii) What are the reasons for incorrect analytical results?
 - iv) What is validation of analytical methods? Give its importance.
- B) Attempt **ANY ONE** of the following:
- i) How are raw materials and intermediates sampled? (04)
 - ii) Write a detailed note on 'Pre-treatment of soil sample'. (04)
- Q. 2** A) Attempt **ANY TWO** of the following: (08)
- i) What is meant by signal to noise ratio(S/N) in chemical analysis? Enlist the sources of noise in instrumental analysis
 - ii) Write a short note on "GLP".
 - iii) Explain the uncertainty evaluation process. Add a note on its importance.
 - iv) Write a note on 'Regulatory affairs in Pharmaceuticals'.
- B) Attempt **ANY ONE** of the following:
- i) The following data were obtained for a voltage measurement in mV on a noisy system : 1.37, 1.84, 1.35, 1.47, 1.10, 1.73, 1.54, 1.08
Assuming that the noise is random, what is the *SIN* ratio? (04)
 - ii) Three measurements and their uncertainties are as follows: (04)
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.
- Q. 3** A) Attempt **ANY TWO** of the following: (08)
- i) What are chelating resins? How are they useful in separation of inorganic and organic compounds?
 - ii) Explain the principle and instrumentation of Ion Chromatography.
 - iii) Write 'a note on Size Exclusion Chromatography.
 - iv) Explain the selectivity of ion exchangers for cation and anion with the help of ion exchange equilibria.
- B) Attempt **ANY ONE** of the following:
- i) What are the applications of gel permeation chromatography? (04)
 - ii) Calculate the number of milligrams of Na^+ and Mg^{+2} taken up by 2.250g of cation exchange resin with exchange capacity of 4.70 m mol/g of resin (04)
(At wt of Na = 23 and Mg = 24.3)

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

- i) Explain the instrumentation for super critical fluid chromatography.
- ii) How is affinity chromatography used in the separation of biomolecules?
- iii) What are supercritical fluids? Give their properties.
- iv) Differentiate between TLC and OPLC.

B) Attempt **ANY ONE** of the following:

- i) Explain the use of supercritical fluids in food and environment analysis. (04)
- ii) Explain the instrumentation of Affinity chromatography. (04)

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

- i) How are cosmetic samples pretreated?
- ii) Explain the concept quality by design.
- iii) What are the hardware devices for noise reduction?
- iv) Write a note on "GMP".
- v) Explain the synthetic ion exchangers with suitable examples.
- vi) Describe the instrumental method of determination of molecular weight of polymer.
- vii) Give the applications of OPLC.
- viii) How is supercritical fluid chromatography used in polymeric analysis?
