

[Time: 2.30 Hours]

[ Marks:60]

Please check whether you have got the right question paper.

I

- N.B:
1. All questions are compulsory.
  2. Figures to the right indicate full marks.
  3. The use of a log table or a non-programmable calculator is permitted.

Q.1 A Attempt Any Two of the following: 08

- i) What are the appropriate steps to be taken when a sample is received in any laboratory for analysis?
- ii) With a suitable example, explain percent non-conforming items.
- iii) Discuss "precision" as a criterion for selecting a method of analysis.
- iv) Elaborate the factors "incompetence" and "method used" which contribute to produce incorrect analytical results.

B) Write a note in detail on Reporting Results. 04

B) Construct a list of actions you take to demonstrate that a method's performance is adequate for your purpose. 04

Q.2 A Attempt Any Two of the following: 08

- i) Explain the following potential sources of uncertainty that could affect the results of a chemical measurement: sampling and sample effect.
- ii) Justify the statement: "The concept of uncertainty is introduced as a suitable measure of quality".
- iii) What are the basic requirements of quality control in GMP?
- iv) Discuss the hardware techniques to enhance the signal to noise ratio.

B) Three quantities are  $a = 49.71$ ,  $b = 64.39$ ,  $c = 25.47$  and their respective uncertainties are 0.06, 0.08, 0.05; if the final measurement is of the type  $Y = a + b + c$ , calculate the combined uncertainty in the measurement of Y. 04

OR

B) The following data were obtained for a potential measurement in mV capital on a noisy system: 15.86, 15.53, 16.31, 16.08, 15.93, 16.19, 15.75, 15.67, 16.22, 16.02 assuming that the noise is random, calculate the signal to noise ratio of the system. 04



Q.3 A Attempt Any Two of the following:

- i) Explain the separation of uncharged organic molecules using ion exchange resins.
- ii) Discuss the properties of supercritical fluids? Why do we need to modify some properties of supercritical fluids?
- iii) How do liquid ion exchangers work?
- iv) Write a note on ion exchange equilibrium.

B) 500 cm<sup>3</sup> of sodium ion solution containing 5g / dm<sup>3</sup> sodium chloride is allowed to pass through a cation exchanger with 6.5 m mol / g exchange capacity dry resin. What is the minimum weight of the resin required to remove sodium ions completely from 1 dm<sup>3</sup> of the solution? (Na = 23, Cl = 35.5)

04

OR

B) Why is it necessary to employ suppressor column in ion chromatography? Explain the working of suppressor column in ion chromatography.

04

Q.4 A Attempt Any Two of the following:

08

- i) State the applications of inverse gas chromatography.
- ii) Discuss the instrumentation of supercritical fluid chromatography.
- iii) In affinity chromatography, discuss the role played by the stationary phase and the mobile phase.
- iv) Discuss the theory of size exclusion chromatography.

B) What are the applications of Supercritical Fluid Chromatography?

04

OR

B) Explain the theory underlying the technique of affinity chromatography.

04

Q.5 A Attempt Any Two of the following:

12

- i) What are the risks associated with poor sampling?
- ii) Discuss GLP with reference to laboratory facilities.
- iii) What is environmental noise?
- iv) State the documentation requirements for Quality Management System.
- v) What is Breakthrough capacity of ion exchange resin?
- vi) In brief, explain ion exchange in non-aqueous medium.
- vii) Explain the principle of affinity chromatography.
- viii) State the advantages of size exclusion chromatography.