BCHET-141

ASSIGNMENT BOOKLET

Bachelor's Degree Programme
(BSCG)

ANALYTICAL METHODS IN CHEMISTRY

Valid from 1st January, 2025 to 31st December, 2025

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2025)

Dear Student,

Please read the section on assignments in the Programme Guide for B. Sc. that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment is in this booklet, and it consists of two parts, Part A and B. It covers all blocks of the course. The total marks of all the parts are 100, of which 35% are needed to pass it.

Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO.: ……

NAME: ……

ADDRESS: ……

……

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COURSE CODE: …….

COURSE TITLE: …….

ASSIGNMENT NO.: ……..…

STUDY CENTRE: ……..….. **DATE:** …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) Solve Part (A) and Part (B) of this assignment, and **submit the complete assignment answer sheets within the due date.**

6) The assignment answer sheets are to be submitted to your Study Centre within the due date. **Answer sheets received after the due date shall not be accepted.**

   We strongly suggest that you retain a copy of your answer sheets.

7) This assignment is **valid from 1st January, 2025 to 31st December, 2025**. If you have failed in this assignment or fail to submit it by December, 2025, then you need to get the assignment for the year 2026, and submit it as per the instructions given in the Programme Guide.

8) **You cannot fill the examination form for this course** until you have submitted this assignment.

We wish you good luck.

ASSIGNMENT

ANALYTICAL METHODS IN CHEMISTRY

Course Code: BCHET-141
Assignment Code: BCHET-141/TMA/2025
Maximum Marks: 100

Note: Attempt all questions. The marks for each question are indicated against it.

Par A (50 marks)

1	Writ the procedure for the sampling of soil samples.	(5)
2	Define determinate errors. How we can reduce them.	(5)
3	What is significance of *F*-test? Explain using a suitable example.	(5)
4	Briefly explain the extractions with diphenylthiocarbazone. How is change in pH useful in such extractions?	(5)
5	Discuss the extraction of an organic compound when it is present in the aqueous phase along with the impurities.	(5)
6	How is extraction of metal chlorides and nitrates carried out using solvation?	(5)
7	How can a mixture of three components be separated using ascending paper chromatography? Draw the suitable diagram and explain.	(5)
8	Give at least five examples each of mobile phases and locating agents used in paper chromatography	(5)
9	Briefly explain various factors affecting the efficiency of column chromatography	(5)
10	Why is selectivity coefficient of an ion exchanger important? Give the order of selectivity coefficients of different cations and anions.	(5)

Par B (50 marks)

11	Drive an expression for the 'operational definition of pH.	(5)
12	Discuss design and working of calomel and glass electrodes.	(5)
13	Describe different factors effecting conductance.	(5)
14	A conductivity cell shows a resistance of 3950 Ω at 25oC when filled with the experimental solution and 4864 Ω at the same temperature when filled with 0.02 M KCl solution. If the conductivity of the solution is 2.767×10^{-3} S cm^{-1}, calculate the conductivity of the experimental solution.	(5)
15	Describe the experimental setup of TGA. Taking suitable examples explain the effect of furnace atmosphere on TG curves.	(5)
16	An impure sample of $CaC_2O_4 \cdot H_2O$ is analyzed using TGA technique. TG curve of the sample indicates the total mass change from 85 mg to 30.7 mg when this sample was heated up to 1173 K. calculate the purity of the sample.	(5)
17	(a) Define electromagnetic radiation and state the relationship between the velocity and wavelength of an electromagnetic radiation.	(2)
	(b) Molecular spectra are band spectra whereas atomic spectra are line spectra. Explain.	(3)

18	(a)	State Beer and Lambert's law and write its mathematical expression.	(2)
	(b)	What are monochromators? Explain the working of prism monochromator with the help of a suitable diagram.	(3)
19	(a)	Calculate the number of vibrational degrees of freedom for ethane, C_2H_6, explain the fingerprint and functional group regions in IR spectrum.	(3)
	(b)	Outline the advantages of premix burner in atomic spectroscopy. Discus structure of a laminar flow flame showing various zones.	(2)
20		List different excitation sources used for atomic emission spectrometry. Discuss the interferences observed in flame atomic emission Spectrometry	(5)