BCHET-141

ASSIGNMENT BOOKLET

Bachelor's Degree Programme
(BSCG)

ANALYTICAL METHODS IN CHEMISTRY

Valid from 1st January, 2023 to 31st December, 2023

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2023)

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, 2023 to 31st December, 2023**. If you have failed in this assignment or fail to submit it by December, 2022, then you need to get the assignment for the year 2024, 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/2023
Maximum Marks: 100

PART A — 50

1 How will you carry out collection of water samples and their preservation? (5)

2. Write various sources of Determinate Errors. (5)

3. What is F-test? To illustrate "F" test suppose that two series of observations are made one of 4 observations of standard deviation equal to 0.02 and another of 6 observations of standard deviation equal to 0.04. Then what do we have to test? (5)

4 Explain the terms-distribution ratio and distribution coefficient. When are these two terms not identical? Discuss. (5)

5 When is solvent extraction useful? Using suitable diagram, explain how it is carried out. (5)

6 Explain various types of liquid chromatographic techniques with the help of a suitable diagram. (5)

7 How can you separate the components A, B and C of a mixture using paper chromatography? Explain using suitable diagram. (R_f value of B is greater than A but less than C.) (5)

8 What are the similarities and differences in adsorption and partition chromatographies? (5)

9 Explain the development of chromatogram for the separation of the mixture containing three compounds P, Q and R using frontal analysis. Give suitable diagram also. (5)

10 Discuss natural ion exchangers by giving suitable examples. (5)

PART B — 50

11 Derive the Nernst expression for a galvanic cell. (5)

12 What are the characteristics of a reference electrode? Describe the construction and working of a Calomel electrode. (5)

13 What are molar conductivity and limited molar conductivity? Resistance of a conductivity cell filled with 0.1M KCl solution is 100 Ω. If the resistance of the same cell when filled with 0.02 M KCl solution is 520 Ω, calculate the conductivity and molar conductivity of 0.02 M KCl solution. The conductivity of 0.1 M KCl solution is 1.29 S m^{-1}. (5)

14 Discuss various sources of errors in TGA. (5)

15 A mixture of $CaCO_3$ and CaO is analysed using TGA method. TG curve of the sample indicates that there is a mass change from 290.6 mg to 230.8 mg between 500-900°C. Calculate the percentage of $CaCO_3$ in sample. (5)

16 Briefly explain the nature of spectra in atomic and molecular systems with the help of suitable examples. (5)

17 Discuss the methodology of quantitative determinations by UV-VIS spectrometry. (5)

18 a) Describe the steps involved in getting IR spectrum of the sample using FT-IR instrument with interferometer. (2)

b) List the advantages of FT-IR instrument over dispersive IR instrument. (3)

19 Explain the characteristics of atomic spectra. (5)

20 Discuss the merits and limitations of FAE spectrometry. (5)