

**ASSIGNMENT BOOKLET****Bachelor's Degree Programme (B.Sc.)****PHYSICAL CHEMISTRY**

**It is Compulsory to submit the Assignment before filling in the Term-End Examination Form.**

**(Valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025)**

**Please Note**

- You can take electives (56 to 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.
- You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.
- At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits should be from lab courses.
- You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the onus will be on you.



**School of Sciences**  
**Indira Gandhi National Open University**  
**New Delhi**  
**(2025)**

Dear Student,

We hope, you are familiar with the system of evaluation to be followed for the Bachelor's Degree Programme. At this stage you may probably like to re-read the section on assignments in the Programme Guide that we sent you after your enrolment. A weightage of 30 percent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment. The assignment is based on Blocks 1, 2, 3 and 4.

### Instructions for Formatting Your Assignments

Before attempting the assignments, 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:

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ENROLMENT NO.:.....  
NAME:.....  
ADDRESS:.....  
.....  
.....

COURSE CODE : .....

COURSE TITLE : .....

ASSIGNMENT NO.: .....

STUDY CENTRE : ..... DATE:.....  
(NAME AND CODE)

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**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. While writing answers, clearly indicate the Question No. and part of the question being solved.
6. Please note that:
  - i) The Assignment is valid from 1<sup>st</sup> January, 2025 to 31<sup>st</sup> December, 2025.
  - ii) The response to this assignment is to be submitted to the Study Centre Coordinator within eight weeks of the receipt of this booklet in order to get the feedback and comments on the evaluated assignment.
  - iii) In any case, you have to submit the assignment response before filling the exam for the term end examination.
7. We strongly suggest that you should retain a copy of your assignment responses.  
Wishing you all good luck.

**Tutor Marked Assignment**  
**CHE-04: PHYSICAL CHEMISTRY**

Course Code: CHE-04  
Assignment Code: CHE-04/TMA/2025  
Maximum Marks: 100

**Note: Answer all the questions given below. The marks are indicated in the brackets.**

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1. a) What is the dimensional formula and SI unit of pressure? (2)
- b) State the assumptions made by Langmuir to obtain the absorption isotherm. (3)
2. Using a suitable diagram, explain the most probable speed, the average speed and the root mean square speed (5)
3. Derive van der Waals equation. (5)
4. What is reduced pressure distillation? How is it useful? (5)
5. Name different types of crystal systems. Give one example of the compounds belonging to each of these systems. (5)
6. Define the following terms: (5)
  - i) Isolated system
  - ii) Isothermal process
  - iii) Adiabatic process
  - iv) Isobaric process
  - v) Isochoric process
7. Calculate the standard internal energy change for the formation of water at 298 K. The standard enthalpy of formation of  $\text{H}_2\text{O} (l)$  at 298 K is  $-285.8 \text{ kJ mol}^{-1}$ . (5)
8. How will you calculate the net work done in a Carnot cycle? (5)
9. Explain Nernst heat theorem. (5)
10. Briefly discuss the factors affecting solubility of gases in liquids. (5)
11. Using suitable diagrams, discuss the mutual solubilities of components of the following liquid pairs which have (5)
  - (a) lower critical solution temperature,
  - (b) upper critical solution temperature, and
  - (c) both upper and lower critical solution temperatures.
12. Briefly explain the laws of osmotic pressure. (5)
13. Discuss the phase diagram of KI- $\text{H}_2\text{O}$  system giving the suitable diagram (5)
14. Derive the expression relating equilibrium constant with temperature. (5)
15. (a) What are polyprotic acids? Explain with the help of an example. (2)
- (b) Calculate the pH of  $1.0 \times 10^{-8} \text{ M}$  HCl solution. (3)
16. Discuss Hittorf method of determination of transport numbers.

17. Explain important features of standard hydrogen electrode giving the suitable diagram.
18. Briefly give various experimental methods for studying the reaction rates.
19. What are photosensitised chemical reactions? Explain giving suitable examples.
20. How are physical properties of colloidal solutions different from those of true solutions and coarse dispersions? Explain.