

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 1st January, 2020 to 31st December, 2020)

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
(2020)

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:

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

COURSE CODE :

COURSE TITLE :

ASSIGNMENT NO.:

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

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 1st January, 2020 to 31st December, 2020.
 - 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/2020
Maximum Marks: 100

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

1. a) What is the value of density of mercury non-SI units? Convert and express this quantity in SI unit. (2)
- b) List the factors on which the amount of a gas adsorbed on a solid depends. (3)
2. State Dalton's law of partial pressure. Derive its mathematical form. (5)
3. Derive equation of corresponding states. (5)
4. What are liquid crystals? Explain their different types. (5)
5. State Bragg law. List the assumptions made by Bragg in deriving Bragg equation. (5)
6. Derive the equation for the work of expansion for an isothermal reversible process. (5)
7. Define enthalpy of combustion. Calculate the enthalpy of combustion of methanol if the enthalpies of formation of CO₂, H₂O and CH₃OH are, respectively, -393.5 kJ mol⁻¹, -285.8 kJ mol⁻¹ and -239.0 kJ mol⁻¹. (5)
8. Draw and explain the steps involved in Carnot cycle. (5)
9. Discuss the dependence of chemical potential on temperature and pressure. (5)
10. What are the characteristics of ideal and non-ideal solutions? Give one example of each type of these solutions. (5)
11. Give the thermodynamic derivation of the distribution law. (5)
12. What is relative lowering of vapor pressure? How can lowering of vapour pressure be measured using static method? (5)
13. Discuss the phase diagram of water. (5)
14. State Le Chatelier's principle. Discuss the effect of change of concentration on the following reaction: (5)
$$\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$$
15. For the hydrolysis of a salt of a weak acid and a weak base, show that (5)
$$K_h = \frac{K_w}{K_a K_b}$$
16. How can ionic product be determined using conductivity measurements? Explain. (5)
17. Discuss the working of metal-insoluble salt electrode by taking a suitable example. (5)
18. Derive integrated rate law for the first order reactions. (5)
19. Briefly explain the laws of photochemistry. (5)
20. Discuss the methods of preparation of lyophilic colloidal dispersions using dispersion methods. (5)