

ASSIGNMENT BOOKLET**Bachelor's Degree Programme (B.Sc.)****(Valid from 1st January, 2013 to 31st December, 2013)****Insert box here.****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 and unless you have submitted the assignment. Otherwise, your result will not be declared and the onus will be on you.

**School of Sciences****Indira Gandhi National Open University****Maidan Garhi, New Delhi-110068****(2013)**

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- 6.

Instructions for Formatting Your Assignment Responses

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.

- 1 Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 2 Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 3 Your answers should be precise.
- 4 While writing answers, clearly indicate the Question No. and part of the question being answered.
- 5 Please note that:
 - (i) The Assignment is valid from 1st January, 2013 to 31st December, 2013.
 - (ii) The response to this assignment is to be submitted to the Study Centre Coordinator within twelve 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 appearing in the term end examination.**
- 6 We strongly suggest that you should retain a copy of your assignment responses.

Wishing you all good luck.

Tutor Marked Assignment

Course Code: AEC - 01
Assignment Code: AEC 01/TMA/2013
Maximum Marks: 100

- Note:** * This assignment is based on the **Blocks 1-6**.
* All questions are compulsory. Marks for the questions are shown within brackets on the right hand side.
* Please answer in your **own words**; do not copy from the course material.
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- Q.1 a) Differentiate between soil horizon and soil profile. What is their relationship to the pedon? (3)
b) How are the metamorphic rocks developed? Explain with the help of an example. (2)
c) How does soil aeration affect plants? Explain the change in soil colour due to a change in oxidation state of metals present in soil. (3)
d) Calculate the percentage pore space in soil with bulk density 0.99 Mg/m^3 and a particle density of 1.9 Mg/m^3 . (2)
- Q.2 a) What is meant by nutrient availability in soil? How is it related to the soil fertility evaluation? Explain the variation in availability of nitrogen and phosphorous in a given pH range. (5)
b) In what way is the high heat capacity of water helpful for the living world? (2)
c) Mention the ways in which water is wasted in domestic supply system in cities of developing countries. (3)
- Q.3 a) Explain how by adjusting plant nutrients water efficiency can be improved for agriculture. (2)
b) In a water sample the concentration of dissolved oxygen is found to be $1.53 \times 10^{-3} \text{ M}$. Express the dissolved oxygen content in ppm unit in the sample. The molar mass of O_2 is 32 g mol^{-1} . (3)
c) What is the chemical reason for the foul smell around a water system which has undergone severe biodegradation? Give the relevant chemical equations for their formation. (1+2)
d) What could happen if Ca Mg & Cu would be present in excess in drinking water? (2)
- Q.4 a) Describe different regions of atmosphere on the basis of distribution of temperature. What is lapse rate? (5)
b) What are primary and secondary meteorological parameters? List them. What do you understand by temperature inversion? (5)
- Q.5 a) What are anthropogenic pollutants? What is the difference between primary and secondary pollutants? Give examples of each. (3)
b) What are the parameters for categorization of quality of air? (2)
c) Discuss the method of aeration for the treatment of dairy waste. What are the problems associated with it? (5)
- Q.6 a) Describe about the presence of phosphorous in waste water and its removal. (5)
b) What are various groups of pollutants present in water? Explain. (5)

- Q.7 a) Describe how the biological agents cause disease in the humans and animals through soil pollution. (5)
- b) State the factors on which the collection of air samples depends. Also write the process of air sampling. (3)
- c) Write the precautions observed while preparing a soil sample. (2)
- Q.8 a) What is the principle of solvent extraction? Explain the procedure of separating a neutral organic and acidic organic component from the mixture using the solvent extraction technique. (5)
- b) With the help of an example explain the process of ion exchange in ion exchange chromatography. How is this separation technique used for the softening and deionization of water? (5)
- Q.9 a) Draw a schematic diagram of cell containing a pH glass electrode. Derive an expression for the operational definition of pH. (5)
- b) Give the applications of conductivity. At 298K, the resistance of 1.00×10^{-2} M KCl is 150Ω , while for 1.00×10^{-2} M HCl the resistance is 51.4Ω . The conductivity of the KCl solution at 298K is $1.41 \times 10^{-3} \Omega^{-1}$. Calculate the cell constant and the conductivity of the HCl solution. (5)
- Q.10 a) Describe the steps of a typical procedure used for spectrophotometric determination of a substance. (5)
- b) What are the possible precautions one should consider when water samples are to be collected and submitted for bacteriological analysis? Give brief details of the multiple tube fermentation test. (5)