ASSIGNMENT BOOKLET

Certificate in Water Harvesting and Management (CWHM)

(Assignment for the January and July Sessions 2021)

Note: First of all, read the assignment/questions and instructions carefully and identify the components of an assignment. You should read the relevant sections and sub-sections of a unit while preparing your responses and write answers in your own words. Your responses should not be a verbatim reproduction of the textual materials/blocks provided for self-learning purposes. We also suggest that, you may read additional materials available in your study centre or in any other library before preparing your responses. But extra reading is not a must to answer these assignments.

School of Agriculture
Indira Gandhi National Open University
New Delhi -110068
2021

Dear Learner,

Welcome to the Certificate in Water Harvesting and Management (CWHM) programme.

We hope that you have gone through the Programme Guide for CWHM carefully. It is extremely important to complete the assignments within the stipulated time to be eligible to appear for the term-end examination. All the assignments of CWHM are Tutor Marked Assignments (TMAs) and are part of the continuous evaluation process.

Before you write the assignments, read the instructions provided in the Programme Guide carefully and go through the course materials. If you have any doubts or problems pertaining to the courses and assignments, do feel free to contact us at the School of Agriculture.

You are requested to go through the course material first and then complete the assignments. Your answers should not be a verbatim reproduction of the textual materials/blocks provided for self-learning purposes. On top of the first page of your answer sheet, please write the details exactly in the following format.

Enrollment no:……..…….
Name:……..……..
Address:……
…….
…….

Course Code:……..
Course Title:……
Study Centre:…….. Date:…….
(Name and Code)

Please submit your assignments at the Study Centre allotted to you before the due date as mentioned below:

Course Code	**Last Date for January 2021 Session**	**For July 2021 Session**
ONR-001	28th February 2021	31st August 2021
ONR-002	15th March 2021	15th September 2021
ONR-003	25th March 2021	25th September 2021

We suggest that you should retain a copy of your assignment responses.

Wish you all good luck for successful completion of the programme.

Note: Minimum 35% marks in Continuous Assessment i.e., each assignment in each course is required for completion of a course for CWHM programme.

School of Agriculture
Indira Gandhi National Open University,
Maidan Garhi, New Delhi-110068, India.

Introduction to Water Harvesting
Course Code: ONR-001

Maximum Marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Discuss the importance of rainwater harvesting for urban areas in the present scenario.	5
	(b) Irrigation has given a due place in overall agriculture development in India, justify in your words.	5
2.	(a) Define irrigation efficiency and irrigation intensity. Explain how it can be improved in Indian conditions?	5
	(b) What is irrigation potential? Describe the efforts for enhancing irrigation potential since independence?	5
3.	(a) Define water pollution? Differentiate between surface and subsurface water pollution.	5
	(b) What is roof top rainwater harvesting? Enlist its advantages.	5
4.	(a) Discuss various step different state governments have taken for enforcing rainwater harvesting.	5
	(b) Discuss the importance of integrated watershed management in improving the socio-economic conditions of the rural people.	5
5.	Explain with the help of a flow diagram institutional arrangement for effective implementation of watershed programmes in India.	5

Basics of Hydrology
Course Code: ONR-002

Maximum Marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Define surface runoff. Describe the factors affecting surface runoff.	5
	(b) What is infiltration? Explain how it can measure?	5
2.	(a) Differentiate between convective and cyclonic rainfall.	5
	(b) Enlist different types of recording and non-recording rain gauge. Describe the tipping bucket type of rain gauge.	5
3.	(a) Describe the different forms of Precipitation.	5
	(b) What is water budget? Write water budget equation and explain its different components.	5

4.	(a) Discuss Normal Ratio Method for estimation of missing rainfall data. (b) Explain the rational method for runoff rate estimation in detail.	5 5
5.	(a) A stream of 20 m^3/sec discharge has pollutant concentration of 500 ppm (mg/l). The effluent from an industry is discharged into the stream at the rate of 2.5 m^3/sec with a concentration of 25000 ppm. Compute the resultant concentration. (b) Define disinfection. Explain process of conventional water treatment plant with the help of flow diagram.	5 5

Water Harvesting Conservation and Utilization

Course Code: ONR-003

Maximum Marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Discuss the importance of water harvesting for agriculture sustainability. (b) Enlist different surface water harvesting technique. Explain any two in detail.	5 5
2.	(a) Describe the importance of ITK techniques in water harvesting. Discuss any four ITK used in India. (b) Discuss in detail roof top rainwater harvesting. Write its significance in urban areas.	5 5
3.	(a) Calculate the volume of water harvested from a catchment of 20 ha, located in Malda, West Bengal and received rainfall 25 mm on a particular day. Assume runoff coefficient 0.4. (b) Describe the drip irrigation method. Write its significance in the area of water scarcity.	5 5
4.	(a) A farmer applying 6 cm irrigation to wheat crop for 20 ha area and meeting water requirement of 20 cows and of 25 buffaloes. Assume requirement of cow and buffaloes are 70 and 60 litres/ day. Compute the gross storage capacity of a water storage pond to meet the water need for 30 days. (b) What are the different types of catchments surfaces from where the rainwater can be harvested? Explain.	5 5
5.	(a) What is artificial groundwater recharge? Describe different ideal conditions for artificial groundwater recharge. (b) What is lining? Describe different lining materials used for controlling the seepage losses.	5 5