ASSIGNMENT BOOKLET

Certificate in Water Harvesting and Management (CWHM)

(Assignment for the January and July Session 2022)

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
2022

Dear student,
Welcome to the Certificate in Water Harvesting and Management (CWHM) Programme.

We hope that you have gone through the Programme Guide of 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 2022 Session**	**Last Date for July 2022 Session**
ONR-001	28th February 2022	15th August 2022
ONR-002	15th March 2022	30th August 2022
ONR-003	25th March 2022	25th September 2022

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

Happy Learning! 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.

Course Title: Introduction to Water Harvesting
Course Code: ONR-001

Maximum marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Define rainwater harvesting. Explain why rainwater harvesting is important in major cities of the country? (b) Describe the role of groundwater in Irrigation.	5 5
2.	(a) Rainwater harvesting was practiced in ancient time, discuss with suitable examples. (b) Visit a nearby river and observe the colour of water at different places in the river and compare it with the water available at your home.	5 5
3.	(a) Write advantages and limitations of the roof top rainwater harvesting. (b) Describe the main step different state governments have taken for enforcing rainwater harvesting?	5 5
4.	(a) Discuss the important functions of Project Implementing Agency. (b) What is integrated watershed management? Describe how it is important in sustaining livelihood of rural people?	5 5
5.	(a) What is WDT? Explain its functions. (b) What is water pollution? Differentiate between groundwater and surface water pollution.	5 5

Course Title: Basics of Hydrology
Course Code: ONR-002

Maximum marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Describe the rainfall intensity-duration-frequency relationship. Write its importance? (b) Define runoff. How weather conditions affect the runoff, discuss?	5 5
2.	(a) Explain the curve number method of direct runoff estimation. Compute potential maximum retention if curve number (CN) is 80. (b) Describe the arithmetic mean method for estimation for missing rainfall data.	5 5
3.	(a) What is water budget? Write mathematical equation of water balance and define its different terms. (b) Explain velocity area method of runoff measurement.	5 5
4.	(a) Explain physical and chemical characteristics of water quality. (b) Describe Normal Ratio Method for estimation of missing rainfall data. The normal annual rainfall at station *A*, *B*, *C* and *D* in a catchment 770, 621, 530 and 474 mm respectively during the year 2019. The station *C*	5 5

	was out of order and annual precipitations for station *A, B* and *D* were recorded as 670, 554 and 365 mm respectively. Estimate the rainfall at station *C* in the year 2019.	
5.	Differentiate between the following: (i) Evaporation and transpiration. (ii) Recording type and non recording type of rain gauge. (iii) Point source and non point source surface water pollution. (iv) Effluent and influent flow.	4×2.5=10

Course Title: Water Harvesting, Conservation and Utilization

Course Code: ONR-003

Maximum marks: 50

Answer the following questions. All questions carry equal marks.

1.	(a) Describe the importance of water conservation for agriculture in present scenario? (b) Under what conditions embankment type and dug out cum embankment type are constructed.	5 5
2.	(a) Describe the role of contour vegetative barrier for *in-situ* water harvesting with the help of neat diagram. (b) What is artificial groundwater recharge? Write advantages of artificial groundwater recharge?	5 5
3.	(a) What is irrigation scheduling? Write its role in maximizing irrigation efficiencies. (b) Determine the gross capacity of pond for applying 6 cm depth of irrigation to 10 ha area and meeting water need of 40 buffaloes and 25 cows for 1 month. Assume necessary data.	5 5
4.	(a) Define water use efficiency. Calculate the farm conveyance efficiency, if discharge of 60 litre per second from the source was released and 48 litre per second was delivered to the field. (b) What is lining of ponds? Explain its importance in reducing the water losses in the field?	5 5
5.	(i) Enumerates major steps for domestic water conservation. (ii) Differentiate between recharge shafts and recharge trenches.	5 5