

# ASSIGNMENT BOOKLET

## Certificate in Water Harvesting and Management (CWHM)

### (Assignments for the January and July Session 2017)

**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  
2017

Dear student,

As you are aware that for theory, the weightage to the term-end examination will be 70% and the weightage to the continuous assessment will be 30%. The continuous assessment is in form of assignments. There is one assignment for each course i.e. total eight assignments for the programme. Each assignment will be of 50 marks which ultimately will be converted to have weightage of 30 % of theory. Instructions to format your assignments are as follows:

### Instructions to format 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.

---

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

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

---

**Please follow the above format strictly to facilitate evaluation and to avoid delay.**

2. Use foolscap size paper for writing your answer.
3. Leave 4 cm margin on the top, bottom and left of your answer sheet.
4. Students are advised to give the relevant points from the course material and elaborate their answers and explain in their own language instead of reproducing the language of the course materials.
4. Clearly indicate question no. and part of the question being solved while writing answers.

#### Assignment No. Date of Submission

| Course Code | Last Date for January 2017 Session | Last Date for July 2017 Session |
|-------------|------------------------------------|---------------------------------|
| ONR-001     | 15 <sup>th</sup> February 2017     | 15 <sup>th</sup> August 2017    |
| ONR-002     | 28 <sup>th</sup> February 2017     | 30 <sup>th</sup> August 2017    |
| ONR-003     | 25 <sup>th</sup> March 2017        | 25 <sup>th</sup> September 2017 |

5. **The Assignments should be sent or submitted to the Programme In-charge (PIC) of the Study Centre allotted to you.**
6. **We strongly 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) What is rainwater harvesting? Explain its role in solving the water scarcity problem of major cities of our country. 5  
(b) Describe the role of groundwater in Irrigation. 5
2. (a) Explain the rainwater harvesting practiced in ancient times, support your answer with suitable examples. 5  
(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
3. (a) What is roof top rainwater harvesting? Discuss its advantages. 5  
(b) Describe the main step different state governments have taken for enforcing rainwater harvesting. 5
4. (a) What is Project Implementing Agency? Discuss its important functions. 5  
(b) Describe how integrated watershed management can play an important role in improving livelihood of rural people. 5
5. (a) What is WDT? Explain its functions. 5  
(b) Differentiate between any two of the following: 2×2.5=5
  - (i) Groundwater and surface water pollution.
  - (ii) Water stress and water scarcity.
  - (iii) Irrigation intensity and Irrigation efficiency.

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

**Maximum marks: 50**

**Answer the following questions. All questions carry equal marks.**

1. (a) Write the general formula of rainfall intensity-duration-frequency relationship with its different components and explain its importance. 5  
(b) How weather conditions affect the runoff? How runoff rate can be estimated? List the assumptions of rational method of runoff estimation. 5
2. (a) Explain the curve number method of direct runoff estimation. Compute potential maximum retention if curve number (CN) is 70. 5  
(b) Explain warm and cold front with the help of schematic diagrams. 5
3. (a) Define water budget. Write mathematical equation of water balance and define its different terms. 5  
(b) How will you measure runoff by volumetric method? A cylindrical tank of 0.8 m diameter and 1.2 m depth fill in 2 minutes. Compute the discharge. 5
4. (a) Define turbidity and electrical conductivity. Determine the total solids per unit volume for a 50.0 ml irrigation water sample. The weight of porcelain dish was 112.0 g and weight of empty porcelain dish after evaporation was 111.1 g. 5

- (b) Describe Normal Ratio Method for estimation of missing rainfall data. 5  
 The normal annual rainfall at station *A*, *B*, *C* and *D* in a catchment is 770, 621, 530 and 474 mm, respectively during the year 2016. The station *C* was out of order and annual precipitation for station *A*, *B* and *D* were recorded as 670, 554 and 365 mm, respectively. Estimate the rainfall at station *C* in the year 2016.
5. Differentiate between the following: 4×2.5=10
- Basic infiltration rate and infiltration capacity.
  - Evaporation and transpiration.
  - Seepage and percolation.
  - Effluent and influent flow.

**Course Title: Water Harvesting, Conservation and Utilization**

**Course Code: ONR-003**

**Maximum marks: 50**

**Answer the following questions. All questions carry equal marks.**

- Describe the importance of water conservation for agriculture in present scenario. 5
  - Discuss the term ITK. Explain any four ITK used in different parts of the country. 5
- List different components of rainwater harvesting system and explain their purpose. 5
  - What is artificial groundwater recharge? Explain the advantages of artificial groundwater recharge. 5
- Define irrigation scheduling and discuss its role in maximizing irrigation efficiencies. 5
  - 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
- Define water use efficiency. Calculate the farm conveyance efficiency, if discharge of 60 litres per second from the source was released and 48 litres per second was delivered to the field. 5
  - What is lining of ponds? Explain its importance in reducing the water losses in the field. 5
- Differentiate between any four of the following: 4×2.5=10
  - In-situ* water harvesting and surface water harvesting.
  - Recharge shaft and recharge trenches.
  - Drip and sprinkler irrigation.
  - Delta and duty.
  - Domestic and community rainwater harvesting systems.