UNIQUE STUDY POINT

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Class: X	**Subject:** Science	**Session:** 2025-26
Chapter: 03 - Water Resources	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q1. The hydrological cycle ensures that water is a:

(a) Non-renewable resource

(b) Renewable resource

(c) Exhaustible resource

(d) Limited resource

Q2. By which year is it predicted that nearly two billion people will live in absolute water scarcity?

(a) 2020

(b) 2025

(c) 2030

(d) 2050

Q3. Which of the following can cause water scarcity in a region with ample water availability?

(a) High rainfall

(b) Water pollution

(c) Good groundwater recharge

(d) Low population density

Q4. The Hirakud project is built on which river?

(a) Ganga

(b) Mahanadi

(c) Narmada

(d) Godavari

Q5. Which ancient Indian ruler extensively built dams, lakes and irrigation systems?

(a) Ashoka
(b) Akbar
(c) Chandragupta Maurya
(d) Harsha

Q6. In the 14th century, which tank was constructed by Iltutmish for supplying water to Siri Fort area?
(a) Bhopal Lake
(b) Hauz Khas tank
(c) Yamuna tank
(d) Qutub Lake

Q7. Agricultural fields converted into rain-fed storage structures in Jaisalmer are called:
(a) Tankas
(b) Kuls
(c) Khadins
(d) Johads

Q8. In Rajasthan, the rainwater collected from rooftops is commonly referred to as:
(a) Pani
(b) Palar pani
(c) Pavitra pani
(d) Pure pani

Q9. Rooftop rainwater harvesting is most common practice in which city of Meghalaya?
(a) Cherrapunjee
(b) Mawsynram
(c) Shillong
(d) Tura

Q10. In Meghalaya, the bamboo drip irrigation system transports water that finally reduces to how many drops per minute at the plant site?
(a) 10-50 drops
(b) 20-80 drops
(c) 50-100 drops
(d) 100-150 drops

SECTION B - Short Answer Questions (2 marks each)

Q11. How can a region with high annual rainfall still suffer from water scarcity? Explain with an example.

Q12. What are multi-purpose river projects? State any two purposes of these projects.

Q13. Mention two disadvantages of multi-purpose river projects on aquatic life.

Q14. What were 'guls' or 'kuls' in the Western Himalayas? What was their purpose?

SECTION C - Short Answer Questions (3 marks each)

Q15. Explain three reasons why water scarcity may occur despite three-fourths of Earth being covered

with water.

Q16. Describe how the construction of wells and tube-wells by farmers for irrigation has affected groundwater levels and food security.

Q17. Why were flood plains deprived of silt due to multi-purpose dams? What is the significance of silt for agriculture?

SECTION D - Long Answer Question (5 marks)

Q18. Water harvesting system was considered a viable alternative to multi-purpose projects. Describe in detail the traditional water harvesting systems practiced in ancient India with suitable examples from different regions.

SECTION E - Case Study Based Questions (4 marks each)

Q19. Read the following case study and answer the questions that follow:

Sardar Sarovar Dam has been built over the Narmada River in Gujarat. This is one of the largest water resource projects of India covering four states - Maharashtra, Madhya Pradesh, Gujarat and Rajasthan. The Sardar Sarovar project will meet the requirement of water in drought-prone and desert areas. It will provide irrigation facilities to 18.45 lakh hectare of land, covering 3112 villages in 15 districts of Gujarat. It will also irrigate 2,46,000 hectare of land in the strategic desert districts of Barmer and Jalore in Rajasthan and 37,500 hectare in the tribal hilly tract of Maharashtra through lift. About 75% of the command area in Gujarat is drought-prone while entire command in Rajasthan is drought-prone.

(a) On which river is the Sardar Sarovar Dam built? (1 mark)
(b) How many states are covered by this project? Name them. (1 mark)
(c) How much land will be irrigated in Gujarat? (1 mark)
(d) Why is this project particularly important for Rajasthan? (1 mark)

Q20. Read the following case study and answer the questions that follow:

In the first century B.C., Sringaverapura near Allahabad had sophisticated water harvesting system channeling the flood water of the river Ganga. During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built. Evidences of sophisticated irrigation works have also been found in Kalinga (Odisha), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), Kolhapur (Maharashtra), etc. In the 11th Century, Bhopal Lake, one of the largest artificial lakes of its time was built.

(a) Which ancient site had sophisticated water harvesting system in the first century B.C.? (1 mark)
(b) During whose time were dams, lakes and irrigation systems extensively built? (1 mark)
(c) Name any two places where evidences of sophisticated irrigation works were found. (1 mark)
(d) When was Bhopal Lake built? (1 mark)

DETAILED ANSWER KEY - PAPER 02

SECTION A - Answers to MCQs

Ans 1. (b) Renewable resource

All water moves within the hydrological cycle ensuring that water is a renewable resource through continuous evaporation, condensation, and precipitation.

Ans 2. (b) 2025

It is predicted that by 2025, nearly two billion people will live in absolute water scarcity despite water being a renewable resource.

Ans 3. (b) Water pollution

Even if there is ample water to meet the needs of people, much of it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilizers, making it hazardous for human use.

Ans 4. (b) Mahanadi

The Hirakud project in the Mahanadi basin integrates conservation of water with flood control.

Ans 5. (c) Chandragupta Maurya

During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built in ancient India.

Ans 6. (b) Hauz Khas tank

In the 14th Century, the tank in Hauz Khas, Delhi was constructed by Iltutmish for supplying water to Siri Fort area.

Ans 7. (c) Khadins

In arid and semi-arid regions, agricultural fields were converted into rain-fed storage structures that allowed water to stand and moisten the soil, called 'khadins' in Jaisalmer.

Ans 8. (b) Palar pani

Rainwater, or palar pani, as commonly referred to in Rajasthan, is considered the purest form of natural water.

Ans 9. (c) Shillong

Rooftop rainwater harvesting is the most common practice in Shillong, Meghalaya. Nearly every household in the city has a rooftop rainwater harvesting structure.

Ans 10. (b) 20-80 drops

In the bamboo drip irrigation system of Meghalaya, about 18-20 litres of water enters the bamboo pipe system, gets transported over hundreds of metres, and finally reduces to 20-80 drops per minute at the site of the plant.

SECTION B - Answers to Short Answer Questions

Ans 11.

A region with high annual rainfall can still suffer from water scarcity due to the following reasons:

- **Large population:** High rainfall region with large population may face water scarcity as more people require more water for domestic use and food production.
- **Water pollution:** Even if water is sufficiently available, it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilizers, making it unsuitable for use.

Example: Shillong city in Meghalaya faces acute water shortage despite Cherrapunjee and Mawsynram (55 km away) receiving the highest rainfall in the world.

Ans 12.

Multi-purpose river projects are projects where dams are built across rivers and many uses of the impounded water are integrated with one another.

Two purposes:

1. **Electricity generation:** Multi-purpose projects generate hydroelectric power for industries and homes.
2. **Irrigation:** The stored water is used to irrigate agricultural fields, especially during dry seasons.

(Other purposes include: water supply for domestic and industrial uses, flood control, recreation, inland navigation, and fish breeding)

Ans 13.

Two disadvantages on aquatic life:

1. **Poorer habitats:** Regulating and damming of rivers causes poor sediment flow and excessive sedimentation at the bottom of the reservoir, resulting in rockier stream beds and poorer habitats for the rivers' aquatic life.
2. **Migration difficulties:** Dams fragment rivers making it difficult for aquatic fauna to migrate, especially for spawning, affecting their reproductive cycles.

Ans 14.

'Guls' or 'Kuls' were diversion channels built in hill and mountainous regions, particularly in the Western Himalayas.

Purpose: These channels were built for agriculture. They diverted water from streams and springs to agricultural fields, helping in irrigation in hilly terrains where traditional irrigation methods were difficult to implement.

SECTION C - Answers to Short Answer Questions

Ans 15.

Three reasons for water scarcity despite three-fourths of Earth being covered with water:

1. **Limited freshwater:** Though three-fourths of the Earth's surface is covered with water, only a small proportion of it accounts for freshwater that can be put to use. Most of Earth's water is in oceans which contains salt water unsuitable for direct human consumption.
2. **Unequal distribution and access:** The availability of water resources varies over space and time, mainly due to variations in seasonal and annual precipitation. Even within regions with adequate water, there may be unequal access to it among different social groups.

3. **Over-exploitation and pollution:** Large and growing population leads to over-exploitation of water resources. Additionally, water may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilizers, making it hazardous for human use even when it is available in sufficient quantities.

Ans 16.

The construction of wells and tube-wells by farmers has affected water resources in the following ways:

1. **Falling groundwater levels:** Most farmers have their own wells and tube-wells in their farms for irrigation to increase their produce. This has led to falling groundwater levels as water is being extracted faster than it can be naturally recharged.
2. **Impact on water availability:** The over-exploitation of groundwater through numerous individual wells and tube-wells has adversely affected water availability in many regions, as groundwater resources are being depleted.
3. **Threat to food security:** As groundwater levels fall, it becomes more difficult and expensive to access water for irrigation. This adversely affects water availability and threatens the food security of people, as agricultural production may decline due to water shortage.

Ans 17.

Reason for deprivation of silt:

Multi-purpose dams cause sedimentation in the reservoir. When rivers are dammed, the sediment that would naturally flow downstream gets trapped in the reservoir. This excessive sedimentation at the bottom of the reservoir means that the flood plains downstream are deprived of silt during normal river flow and flooding.

Significance of silt for agriculture:

1. **Natural fertilizer:** Silt acts as a natural fertilizer for agricultural fields. It is rich in minerals and nutrients that improve soil fertility.
2. **Soil enrichment:** When rivers flood naturally, they deposit silt on flood plains, enriching the soil and making it more productive for agriculture.
3. **Land degradation problem:** When flood plains are deprived of silt due to dams, it adds to the problem of land degradation as the soil loses its natural fertility and requires chemical fertilizers to maintain productivity.

SECTION D - Answer to Long Answer Question

Ans 18.

Traditional water harvesting systems in ancient India:

Archaeological and historical records show that from ancient times, India has had an extraordinary tradition of water-harvesting systems. People had in-depth knowledge of rainfall regimes and soil types and developed wide-ranging techniques to harvest rainwater, groundwater, river water and flood water in keeping with local ecological conditions and water needs.

1. Ancient Sophisticated Systems:

- **Sringaverapura (1st century B.C.):** Near Allahabad, this site had sophisticated water harvesting system channeling the flood water of the river Ganga.
- **Mauryan period:** During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built across the empire.

- **Other regions:** Evidences of sophisticated irrigation works have been found in Kalinga (Odisha), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka), and Kolhapur (Maharashtra).

2. Hill and Mountainous Regions:

- **Guls or Kuls:** In the Western Himalayas, people built diversion channels called 'guls' or 'kuls' for agriculture. These channels diverted stream and spring water to agricultural fields.

3. Arid and Semi-arid Regions:

- **Khadins (Jaisalmer):** Agricultural fields were converted into rain-fed storage structures that allowed the water to stand and moisten the soil.
- **Johads (Rajasthan):** Similar structures in other parts of Rajasthan for collecting and storing rainwater.
- **Rooftop rainwater harvesting:** Commonly practiced in Rajasthan using underground tanks called 'tankas' to store drinking water.

4. Flood Plains:

- **Inundation channels (Bengal):** People developed inundation channels to irrigate their fields using floodwater from rivers.

5. Artificial Lakes:

- **Bhopal Lake (11th Century):** One of the largest artificial lakes of its time.
- **Hauz Khas tank (14th Century):** Constructed by Iltutmish in Delhi for supplying water to Siri Fort area.

Conclusion: These traditional systems were developed based on local ecological conditions and demonstrated sophisticated understanding of hydrology, making them viable alternatives to large-scale modern projects.

SECTION E - Answers to Case Study Based Questions

Ans 19.

(a) The Sardar Sarovar Dam is built over the Narmada River.

(b) Four states are covered by this project. They are:

1. Maharashtra
2. Madhya Pradesh
3. Gujarat
4. Rajasthan

(c) In Gujarat, 18.45 lakh hectare of land covering 3112 villages in 15 districts will be irrigated.

(d) This project is particularly important for Rajasthan because:

- The entire command area in Rajasthan is drought-prone
- It will irrigate 2,46,000 hectare of land in the strategic desert districts of Barmer and Jalore
- Assured water supply will make this drought-prone desert area drought-proof

Ans 20.

(a) Sringaverapura near Allahabad had a sophisticated water harvesting system in the first century

B.C.

(b) During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built.

(c) Evidences of sophisticated irrigation works were found in:

- Kalinga (Odisha)
- Nagarjunakonda (Andhra Pradesh)

(Any two from: Kalinga/Odisha, Nagarjunakonda/Andhra Pradesh, Bennur/Karnataka, Kolhapur/Maharashtra)

(d) Bhopal Lake was built in the 11th Century and was one of the largest artificial lakes of its time.
