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. Freshwater is mainly obtained from:

(a) Rivers and lakes only

(b) Oceans

(c) Surface run off and ground water

(d) Rainfall directly

Q2. Which government mission aims to provide 55 litres of water per capita per day to rural households?

(a) Swachh Bharat Mission

(b) Jal Jeevan Mission

(c) Namami Gange

(d) National Rural Drinking Water Programme

Q3. Which of the following is NOT a traditional hydraulic structure built in ancient India?

(a) Dams built of stone rubble

(b) Reservoirs or lakes

(c) Nuclear power plants

(d) Embankments and canals

Q4. Sardar Sarovar Dam has been built over which river?

(a) Godavari

(b) Krishna

(c) Narmada

(d) Tapti

Q5. Which ecological consequence occurs when farmers shift to water-intensive crops due to irrigation?

(a) Increase in soil fertility

(b) Salinisation of soil

(c) Decrease in water table

(d) Better crop rotation

Q6. The inter-state water dispute between Karnataka, Andhra Pradesh and Maharashtra is regarding which river system?

(a) Cauvery

(b) Godavari-Krishna

(c) Ganga

(d) Mahanadi

Q7. In which village of Karnataka have 200 households installed rooftop rainwater harvesting systems?

(a) Bangalore

(b) Gendathur

(c) Mysuru

(d) Hubli

Q8. What percentage of household water requirement comes from rooftop harvesting in Shillong?

(a) 5-10%

(b) 15-25%

(c) 30-40%

(d) 50-60%

Q9. How old is the bamboo drip irrigation system in Meghalaya?

(a) 50 years

(b) 100 years

(c) 200 years

(d) 500 years

Q10. Atal Bhujal Yojana focuses on bringing behavioral change from:

(a) Waste to wealth

(b) Consumption to conservation

(c) Individual to community

(d) Traditional to modern

SECTION B - Short Answer Questions (2 marks each)

Q11. Why is it difficult to imagine water scarcity despite abundance and renewability of water?

Q12. How have industries affected freshwater resources in India? Mention two ways.

Q13. What are 'johads'? In which state are they found?

Q14. Why is rainwater called 'palar pani' considered the purest form of natural water in Rajasthan?

SECTION C - Short Answer Questions (3 marks each)

Q15. How does a large and growing population lead to water scarcity? Explain with three points.

Q16. Describe the bamboo drip irrigation system practiced in Meghalaya.

Q17. Explain how the reservoirs created by dams affect the existing vegetation and soil in floodplains.

SECTION D - Long Answer Question (5 marks)

Q18. Why is there a need to conserve and manage our water resources? Discuss the importance of water conservation and mention government initiatives taken for water management in India.

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

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

In the semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer, almost all the houses traditionally had underground tanks or tankas for storing drinking water. The tanks could be as large as a big room; one household in Phalodi had a tank that was 6.1 metres deep, 4.27 metres long and 2.44 metres wide. The tankas were part of the well-developed rooftop rainwater harvesting system. Many houses constructed underground rooms adjoining the tanka to beat the summer heat as it would keep the room cool.

(a) Name three places in Rajasthan where tankas were commonly found. (1 mark)
(b) What were the dimensions of the largest tank mentioned in Phalodi? (1 mark)
(c) How were tankas connected to rooftops? (1 mark)
(d) What additional benefit did underground rooms adjoining tankas provide? (1 mark)

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

The Krishna-Godavari dispute is due to the objections raised by Karnataka and Andhra Pradesh governments regarding the diversion of more water at Koyna by the Maharashtra government for a multipurpose project. This would reduce downstream flow in their states with adverse consequences for agriculture and industry. Such inter-state water disputes have become common in India as different states compete for limited water resources from shared river systems.

(a) Which states are involved in the Krishna-Godavari water dispute? (1 mark)
(b) At which location does Maharashtra divert water? (1 mark)
(c) What would be the consequence of water diversion for downstream states? (1 mark)
(d) Why have inter-state water disputes become common in India? (1 mark)

DETAILED ANSWER KEY - PAPER 03

SECTION A - Answers to MCQs

Ans 1. (c) Surface run off and ground water

Freshwater is mainly obtained from surface run off and ground water that is continually being renewed and recharged through the hydrological cycle.

Ans 2. (b) Jal Jeevan Mission

The Government of India announced the Jal Jeevan Mission (JJM) with the goal to enable every rural household to get assured supply of potable piped water at a service level of 55 litres per capita per day.

Ans 3. (c) Nuclear power plants

Archaeological and historical records show that ancient India had sophisticated hydraulic structures like dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation, but not nuclear power plants.

Ans 4. (c) Narmada

Sardar Sarovar Dam has been built over the Narmada River in Gujarat and is one of the largest water resource projects of India.

Ans 5. (b) Salinisation of soil

Irrigation has changed the cropping pattern with farmers shifting to water-intensive and commercial crops. This has great ecological consequences like salinisation of the soil.

Ans 6. (b) Godavari-Krishna

The Krishna-Godavari dispute is due to objections raised by Karnataka and Andhra Pradesh governments regarding water diversion by Maharashtra government.

Ans 7. (b) Gendathur

In Gendathur, a remote backward village in Mysuru, Karnataka, nearly 200 households have installed rooftop rainwater harvesting systems.

Ans 8. (b) 15-25%

In Shillong, nearly 15-25% of the total water requirement of the household comes from rooftop water harvesting.

Ans 9. (c) 200 years

In Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes is prevalent.

Ans 10. (b) Consumption to conservation

One of the key aspects of Atal Bhujal Yojana is to bring in behavioural changes in the community, from the prevailing attitude of consumption to conservation and smart water management.

SECTION B - Answers to Short Answer Questions

Ans 11.

It is difficult to imagine water scarcity despite abundance and renewability of water because:

- **Three-fourths coverage:** Three-fourths of the world is covered with water, giving an impression of abundance.
- **Renewable nature:** Water is a renewable resource as it moves within the hydrological cycle, ensuring continuous renewal and recharge. This renewable nature makes it seem like water can never run out.

However, only a small proportion of this water accounts for usable freshwater, and factors like over-exploitation, unequal access, and pollution cause water scarcity.

Ans 12.

Two ways industries have affected freshwater resources:

1. **Heavy water consumption:** Industries are heavy users of water and require large quantities for their operations. The ever-increasing number of industries has exerted pressure on existing freshwater resources.
2. **Energy demand:** Industries require power to run them, much of which comes from hydroelectric power. This increases the pressure on water resources as water is needed both directly for industrial use and indirectly for power generation.

(Industries also cause water pollution through discharge of wastes)

Ans 13.

'Johads' are traditional rainwater harvesting structures found in Rajasthan. They are rain-fed storage structures where agricultural fields are converted into storage areas that allow water to stand and moisten the soil, similar to khadins. These structures help in water conservation in arid and semi-arid regions.

Ans 14.

Rainwater, or 'palar pani', is considered the purest form of natural water in Rajasthan because:

- It is collected directly from rainfall without passing through polluted sources
- It does not contain dissolved minerals, salts, or contaminants found in groundwater or surface water
- The traditional collection method through rooftops ensures that the first spell (which cleans the roofs and pipes) is not collected, and only subsequent clean rainwater is stored

SECTION C - Answers to Short Answer Questions

Ans 15.

How large and growing population leads to water scarcity:

1. **Increased domestic demand:** A large population requires more water for domestic purposes like drinking, cooking, washing, and sanitation. As population grows, the per capita water availability decreases even if total water resources remain the same.
2. **Greater food production needs:** A large population requires more food production. To facilitate higher food-grain production, water resources are being over-exploited to expand irrigated areas for dry-season agriculture. Irrigated agriculture is the largest consumer of water.

3. **Unequal access and over-exploitation:** Water scarcity becomes an outcome of large population combined with consequent greater demands for water and unequal access to it. Many cities with ample water resources still face water scarcity due to the large and dense populations exceeding the water supply capacity.

Ans 16.

Bamboo drip irrigation system in Meghalaya:

This is a 200-year-old traditional system of tapping stream and spring water using bamboo pipes.

Working mechanism:

1. **Water collection:** Bamboo pipes are used to divert perennial springs on hilltops to lower reaches by gravity. About 18-20 litres of water enters the bamboo pipe system.
2. **Transportation:** The water gets transported over hundreds of metres through the bamboo pipe network. Channel sections made of bamboo divert water to the plant site where it is distributed into branches using different forms of bamboo pipes.
3. **Precise delivery:** The flow is controlled by manipulating pipe positions. Finally, the water reduces to 20-80 drops per minute at the site of the plant. Reduced channel sections and diversion units are used at the last stage to enable water to be dropped near the roots of the plant.

This system demonstrates efficient water management through indigenous technology.

Ans 17.

Effect of reservoirs on vegetation and soil:

1. **Submergence:** The reservoirs created on the floodplains submerge the existing vegetation and soil. Large areas of forest, agricultural land, and natural ecosystems get permanently flooded when the reservoir fills up.
2. **Decomposition:** The submerged vegetation and organic matter in the soil begin to decompose over a period of time. This decomposition process occurs underwater in anaerobic conditions.
3. **Environmental consequences:**
    - The decomposition leads to release of greenhouse gases like methane
    - Loss of valuable topsoil and its nutrients
    - Destruction of habitat for terrestrial plants and animals
    - Loss of biodiversity in the submerged areas

SECTION D - Answer to Long Answer Question

Ans 18.

Need to conserve and manage water resources:

1. Importance of Water Conservation:

- **Health and safety:** To safeguard ourselves from health hazards caused by water pollution and contamination. Clean water is essential for human survival and preventing water-borne diseases.
- **Food security:** To ensure food security for the growing population. Agriculture depends heavily on water, and water scarcity can severely affect crop production and food availability.
- **Economic activities:** To ensure continuation of our livelihoods and productive activities. Industries, agriculture, and various economic activities depend on reliable water supply.
- **Ecosystem preservation:** To prevent degradation of our natural ecosystems. Water bodies

support diverse aquatic and terrestrial life, and their conservation is crucial for biodiversity.
- **Preventing ecological crisis:** Over-exploitation and mismanagement of water resources will impoverish this resource and cause ecological crisis that may have profound impact on our lives.

2. Government Initiatives for Water Management:

a) Jal Jeevan Mission (JJM):

- Accorded highest priority to improve quality of life and enhance ease of living, especially in rural areas
- Goal: Enable every rural household to get assured supply of potable piped water at 55 litres per capita per day
- Ensures functionality of tap water connections on long-term basis

b) Atal Bhujal Yojana (Atal Jal):

- Implemented in 8220 water-stressed Gram Panchayats across 229 blocks in 80 districts
- Covers seven states: Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh
- These states account for 37% of India's water-stressed blocks
- Key focus: Bringing behavioral change from consumption to conservation and smart water management

c) Pradhan Mantri Krishi Sinchayee Yojana:

- Ensures access to protective irrigation for all agricultural farms
- Objectives include:
  - Har Khet Ko Pani (water to every field)
  - Per Drop More Crop (improving water use efficiency)
  - Introducing sustainable water conservation practices

d) Mandatory Rainwater Harvesting:

- Tamil Nadu made rooftop rainwater harvesting compulsory with legal provisions to punish defaulters
- Encourages traditional and modern water harvesting methods

Conclusion: These initiatives demonstrate comprehensive approach to water management combining infrastructure development, behavioral change, and sustainable practices.

SECTION E - Answers to Case Study Based Questions

Ans 19.

(a) Three places in Rajasthan where tankas were commonly found:

1. Bikaner
2. Phalodi
3. Barmer

(b) The dimensions of the largest tank mentioned in Phalodi were:

- Depth: 6.1 metres
- Length: 4.27 metres
- Width: 2.44 metres

(c) Tankas were connected to the sloping roofs of houses through pipes. Rain falling on the rooftops would travel down the pipe and was stored in the underground tankas.

(d) Underground rooms adjoining tankas provided relief from summer heat. These rooms would remain cool as the stored water in the tank helped maintain lower temperatures, providing a natural cooling system to beat the extreme summer heat of Rajasthan.

Ans 20.

(a) Three states are involved in the Krishna-Godavari water dispute:

1. Maharashtra
2. Karnataka
3. Andhra Pradesh

(b) Maharashtra diverts water at Koyna for a multipurpose project.

(c) The water diversion would reduce downstream flow in Karnataka and Andhra Pradesh, leading to adverse consequences for:

- Agriculture - reduced water availability for irrigation
- Industry - insufficient water for industrial operations

(d) Inter-state water disputes have become common in India because:

- Different states compete for limited water resources from shared river systems
- Each state wants to maximize water use for its agriculture and industrial development
- Upstream states' water diversion affects downstream states' water availability
- Growing population and development needs in all states increase demand for water

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