Water Resources

Question 1.

Give some facts and figures about the water resources in the world.

Answer:

- 96.5 per cent of the total volume of world's water is estimated to exist as oceans and only 2.5 per cent exists as fresh water.
- 70 per cent of the fresh water occurs as ice sheets and glaciers in Antarctica, Greenland and the mountainous regions of the world. Less than 30% is stored as groundwater in the world's acquifiers.

Question 2.

Explain how water becomes a renewable resource?

Answer:

- Fresh water is mainly obtained from surface run off and ground water. This is continually being renewed and recharged through the hydrological cycle.
- All the water moves within the hydrological cycle making water a renewable resource.

Question 3.

What percentage of global precipitation does India receive?

Answer:

India receives nearly 4 per cent of the global precipitation.

Question 4.

Where is India ranked in terms of water availability per person per annum? By what year will India join countries having absolute water scarcity?

Answer:

India ranks 133 in the world in terms of water availability per person per annum. By 2025, large parts of India will join countries having absolute water scarcity.

Question 5.

Give an estimate of India's renewable water resources.

Answer:

The total renewable water resources of India are estimated at 1897 sq km per annum.

Question 6.

Write three sources of fresh water.

Answer:

Three sources are:

1 Precipitation — from rainfall.

2 Surface water — in rivers, lakes, etc.

3 Ground water — water stored in underground acquifers which gets recharged by rainfall.

Question 7.

What is water scarcity? Write the main reasons for water scarcity. (2015)

Answer:

Water scarcity means shortage of water. It is usually associated with regions having low rainfall or drought prone areas. There are many other reasons which lead to scarcity of water.

These are:

1 Large growing population—means more water required for domestic use and also to produce more food.

2 In the agricultural sector, water resources are being over-exploited to expand irrigated areas and dry-season agriculture.

3 More water required for irrigation purposes to facilitate higher food production, i.e., for doing multiple cropping and for HYV seeds.

4 There is greater demand for water with growing urbanisation and industrialisation.

5 An unequal access to water among different social groups.

6 The quality of water is deteriorating, i.e., getting polluted by domestic and industrial wastes, chemical fertilizers and pesticides used in agriculture.

7 Excessive use of water by industries which also require water to generate hydro-electric power to run them.

8 Over exploitation of water in the urban areas. Housing societies and colonies have their own ground-water pumping devices. This causes depletion of fragile water resources in the cities.

Question 8.

How intensive industrialisation and urbanisation have posed a great pressure on existing fresh water resources in India? Explain with two examples for each. (2012)

Answer:

Intensive industrialisation and urbanisation have put greater pressure on existing fresh water resources. With the ever growing number of industries, the demand for water has grown tremendously:

1 Industries are heavy users of fresh water as water is required for cooling the machines as well as for the processing of goods.

2 Also the machines run on the power supplied by the hydel power plants.

3 22 percent of the total electricity is hydro-electric power.

4 Rapid urbanisation has led to expansion of industries which increased the requirement of water.

5 The untreated industrial effluents which are discharged into water bodies are polluting the water and making it hazardous for human consumption. This is responsible for creating water scarcity.

On the other hand, multiplying urban centres with:

- Large urban populations and

urban lifestyles have not only added to water and energy requirements but have further aggravated the problem by over-drawing the groundwater by using their own groundwater pumping devices for meeting their water needs for domestic purposes such as cleaning, cooking, washing, etc.

Thus, water resources are being over-exploited which has caused their depletion in several cities.

Question 9.

Write the adverse effects of over-exploitation of ground water resources.

Answer:

1 Pumping out more water from under the ground may lead to falling ground water levels.

2 It will adversely affect water availability.

3 This, in turn, will affect our agriculture and food security of the people.

4 Impoverishment of water resources may adversely affect the ecological cycle.

Question 10.

Write the main causes of water pollution.

Answer:

Water gets polluted by:

1 Domestic wastes, especially urban sewers.

2 Industrial wastes are disposed off in the water without proper treatment.

3 Chemical effluents from industries and from agricultural sector.

4 Pesticides and fertilisers used in agriculture may get washed into rivers by rain-water and may pollute the water by enriching it with minerals.

5 Many human activities, e.g., religious rituals and immersing of idols, etc. in the water also pollute water.

Question 11.

What is the need for conservation of water resources? (2015)

Answer:

1 Our water resources are limited and our requirements are increasing day by day. The water resources are unevenly distributed.

2 Most of our resources especially in the cities and urban areas are polluted and unsuitable for drinking and other purposes.

3 To safeguard ourselves from health hazards.

4 We need to conserve water for the continuation of our livelihoods and to prevent degradation of our natural ecosystem. To ensure food security and for continuation of our livelihoods.

5 For productive activities of the nation.

6 To prevent degradation of our natural ecosystem.

Question 12.

Write some measures adopted for conservation of water resources. (2015)

Answer:

Measures for water conservation:

1 Do not overdraw the ground water, recharge the ground water by techniques like rainwater harvesting.

2 Avoid wastage of water at all levels.

3 Do not pollute the water.

4 Increasing the water resources by tapping the rainwater in reservoirs, watershed development programmes, etc.

5 Adopting water conserving techniques of irrigation, e.g., drip irrigation and sprinklers etc., especially in dry areas.

Sufficient water percolation facilities should be increased to help in raising the level of the water table.

Question 13.

What were the different types of hydraulic structures constructed in Ancient India? Give examples.

Answer:

The different types of hydraulic structures were:

- Dams built of stone rubble e.g., during Chandragupta Maurya's time, dams, lakes and irrigation systems were extensively built.
- Reservoirs or lakes like the Bhopal lake of the 11th century which was one of the largest artificial lakes of its time.
- Embankments and canals for irrigation. Sophisticated irrigation works have been found in Kalinga (Orissa), Kolhapur (Maharashtra), Nagarjunakonda (Andhra Pradesh) etc.
- Many tanks were built to store rainwater e.g., the tank in Huaz Khas in Delhi was built in 14th century to supply water to Siri Fort area.

Question 14.

How was water conserved in ancient India? Give any four examples in support of your answer. (2012)

Answer:

Archaeological and historical records show that from ancient times India has been constructing sophisticated hydraulic structures like dams, reservoirs, embankments and canals for irrigation.

1 For example, in the first century B.C., Allahabad had sophisticated water harvesting system channelling the flood water of the river Ganga.

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

3 Sophisticated irrigation works have been found in Kalinga in Odisha, Nagarjunakonda in Andhra Pradesh, Bennur in Karnataka and Kolhapur in Maharashtra.

4 Bhopal lake, built in the 11th century, was one of the largest artificial lakes of its time.

5 In the 14th century, Iltutmish constructed a tank in Hauz Khas, Delhi for supplying water in Siri Fort area.

Question 15.

What is a dam? Describe the functioning of dams? On what basis are dams classified into different types?

Answer:

A dam is a barrier across flowing water that obstructs, directs or retards the flow, creating a reservoir, lake or impoundment. A dam is the reservoir and not the whole structure.

Functioning:

Most dams have a section called spillway or weir over which or through which, water will flow intermittently or continuously.

Classification:

Dams are classified according to structure, intended purpose or height.

- According to structure and materials used, they are classified as timber dams, embankment dams or masonry dams.
- According to height, they are classified as large and major dams, low dams, medium height dams and high dams.

Question 16.

What is the main difference between traditional dams and modern dams?

Answer:

Traditionally dams were built to impound rivers and rainwater that could be used later to irrigate the agricultural fields. Today, dams are referred to as multipurpose projects where many uses of the impounded water are integrated with one another. The main purposes served by these projects are irrigation, electricity generation, flood control, water supply for domestic and industrial use, fish breeding and tourism.

Question 17.

Why are multipurpose river valley projects called 'The Temples of Modern India'? Who first made this statement? (2014)

Or

Jawahar Lai Nehru proudly proclaimed the 'dams as the temples of modern India'. Analyze this statement. (2013)

Jawahar Lai Nehru proclaimed that multipurpose projects are 'The Temples of Modern India', because they were thought of as the vehicle that would lead the nation to development and progress. He believed that these projects with their integrated water resource management approach would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

Dams or multipurpose river valley projects have the following advantages:

1. They bring water to those areas which suffer from water scarcity and also provide water for irrigation.
2. These projects generate electricity for industries and our homes.
3. They help in controlling floods by regulating the water flow.
4. These projects can be used for recreation, inland navigation and fish breeding.

Question 18.

'Construction of dams on rivers has caused environmental degradation.' Give reasons to support this statement. (2015)

Answer:

1. Damming of rivers affects their natural flow causing poor sediment flow.
2. Excessive sedimentation at the bottom of the reservoir.
3. Lack of sediments results in
   - rockier stream bed and
   - poorer habitat for the river's aquatic life.
4. Dams also fragment rivers, making it difficult for acquatic fauna to migrate, especially for spawning.
5. The reservoirs submerge the existing vegetation and soil, leading to its decomposition over time.
6. Flood plains are deprived of silt and khadar, affecting the fertility levels of the soil.
7. Construction of dams also faces resistance because of large scale displacement of local communities.

Question 19.

Multipurpose projects and dams have been the cause of many new social movements. Name two such social movements and write the underlying causes for these movements.

Answer:

Resistance to these projects came from social movements, e.g.,

1. 'Narmada Bachao Andolan' and
2. 'Tehri Dam Andolan'.

Their major concerns were as follows:

- Initially the environmental concerns were of utmost importance.
- Dams have resulted in large-scale displacement of local communities.

3. Local people have to give up their land and livelihood.
4. Local people do not benefit from such projects as they are even deprived of the local sources on which they have little control.
5. Many settlements and agricultural lands are submerged under water.
6. Rehabilitation of the displaced persons is now the prime concern of these movements.

Question 20.

What are the social consequences of multipurpose projects?

Or

Multipurpose projects have transformed the social landscapes. Explain.

Answer:

1. Local people, especially the landless people, did not gain from these projects.
2. It led to displacement of people which deprived the people of their land and livelihood.
3. It has increased the social gap between the richer landowners and the landless poor.

4 Dams created conflicts between people wanting different uses and benefits from the same water resources.

5 Inter-state water disputes are also becoming common with regard to sharing the costs and benefits of the multipurpose projects.

Question 21.

Explain any three problems faced by local communities due to the construction of large dams. (2017, 2013)

Answer:

Problems faced by local communities due to the construction of large dams:

1 Dams have resulted in large-scale displacement of local communities.

2 Local people have to give up their land and livelihood.

3 Local people do not benefit from such projects as they are even deprived of the local resources on which they have little control.

4 Many settlements and agricultural lands are submerged under water.

Question 22.

Compare the advantages and disadvantages of multipurpose river valley projects.

Answer:

Advantages:

1 They bring water to those areas which suffer from water scarcity and also provide water for irrigation.

2 These projects generate electricity for industries and our homes.

3 They help in controlling floods by regulating the water flow.

4 These projects can be used for recreation, inland navigation and fish breeding.

Disadvantages:

1 They have failed to achieve the purpose for which they were built.

2 The dams that were constructed to control floods have triggered floods due to sedimentation in the reservoir.

3 The big dams have mostly been unsuccessful in controlling floods at the time of excessive rainfall.

4 These floods cause extensive soil erosion in addition to loss of life and property.

5 Sedimentation deprives the flood plains of silt, a natural fertiliser.

6 It was observed that these projects induced earthquakes.

7 Floods cause water-borne diseases and pests.

8 Results in pollution also.

9 These river valley projects lead to large scale displacement of people and loss livelihoods.

Question 23.

What percentage of total electricity produced comes from hydro-electricity?

Answer:

22 per cent of the total electricity produced is from hydro-electric power.

Question 24.

Name two multipurpose projects and the rivers on which they are respectively situated.

Answer:

1 Hirakud Project is situated on river Mahanadi in Orissa, and

2 Bhakra Nangal Project is situated on river Sutlej.

Question 25.

Give an example of an inter-state water dispute.

Answer:

Krishna-Godavari dispute. The Karnataka and Andhra Pradesh Governments objected to the diversion of more water at Koyna by the Maharashtra government for a multipurpose project as this results in reduction of downstream flow to Karnataka and Andhra Pradesh adversely affecting agriculture and industry in these States.

Question 26.

Describe the traditional method of rainwater harvesting adopted in different parts of India.

Answer:

In ancient India, people developed wide-ranging techniques to harvest rainwater.

1 In mountainous areas 'Guls' and 'Kuls' the diversion channels were built for agriculture.

2 'Rooftop rainwater harvesting' was commonly practised to store drinking water, especially in Rajasthan.

3 Inundation channels for irrigation were developed in the flood plains of West Bengal.

4 In arid and semi-arid regions, agricultural fields were converted into rainfed storage structures, eg. 'Khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

5 In semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer, all the houses had underground tanks or 'tankas' built inside the house for storing drinking water. They were a part of the well-developed rooftop rainwater harvesting system.

Question 27.

Explain how rooftop rainwater harvesting in semi-arid regions of Rajasthan is carried out. (2012)

Or

Write the features of the 'tankas' built in the houses of Bikaner, Phalodi and Barmer.

Answer:

'Rooftop rainwater harvesting' was commonly practiced to store drinking water, especially in semi-arid and arid regions like Bikaner, Phalodi and Barmer in Rajasthan.

1 In semi-arid and arid regions, all the houses had underground tankas or 'tankas' for storing drinking water built inside the house. They were the part of the well-developed rooftop rainwater harvesting system.

2 The tankas 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.

3 The tankas were built inside the main house or the courtyard.

4 The tanks were connected to the sloping roofs of the houses through a pipe. The falling rain would travel down the pipes and get stored in the underground 'tankas'. The first spell of rain would not be collected as it cleaned the roof and pipes. The rainwater from subsequent showers was collected.

5 Many houses constructed underground rooms adjoining the tanka to beat the summer heat as it would keep the room cool.

Question 28.

Write how modem adaptations of traditional rainwater harvesting methods are being carried out to conserve and store water.

Answer:

1 In modem times, rainwater harvesting is done in both rural and urban areas to recharge the groundwater by capturing and storing rainwater by constructing structures, e.g., dugwells, percolation pits, digging trenches around fields, etc.

2 Rooftop rainwater harvesting structures are a common practice in many cities. Rain-water is collected using a PVC pipe and is filtered using sand and bricks.

3 This water can be stored to meet the household needs through storage in tanks. This water is readily available for immediate usage.

4 Excess water or a pipe can be connected to an underground reservoir which may recharge the ground-water through hand-pump or through abandoned dugwell. Later, this water can be drawn for varied uses.

5 Storage tanks/reservoirs are built to store rainwater which is later used for irrigation purposes.

Question 29.

Give a brief description of the 'Narmada Bachao Andolan'.

Answer:

Narmada Bachao Andolan or Save Narmada Movement is an NGO (Non-Governmental Organisation) that mobilised tribal people, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam being built across the Narmada river in Gujarat.

The movement originally focussed on environmental issues related to submerging of trees under the dam water.

- Recently its aim has been to enable the displaced poor people to get full rehabilitation facilities from the government.