# WATER RESOURCES
# GEOGRAPHY CLASS 10

1) The freshwater is mainly obtained from surface runoff and groundwater that is continually being renewed and recharged through the _____.
a) sulfur cycle
b) rock cycle
c) hydrological cycle
d) none of the above
Answer: (c)
2) 96.5 per cent of the total volume of the world's water is estimated to exist as _____ and only 2.5 per cent as _____.
a) freshwater, oceans
b) oceans, freshwater
c) groundwater, oceans
d) none of the above
Answer: (b)
3) Nearly 70 per cent of freshwater occurs as ice sheets and glaciers in _____, Greenland and the mountainous regions of the world.
a) Antarctica
b) Siberia
c) Alaska
d) Russia
Answer: Option (a)
4) A little less than _____ of freshwater is stored as groundwater in the world's aquifers.
a) 5%
b) 20%
c) 10%
d) 30%

Answer: Option (d)
5) India ranks _____ in the world in terms of water availability per person per annum.
a) 133
b) 135
c) 17
d) 98
Answer: Option (a)
6) As per one of the Swedish experts, water stress occurs when water availability is between _____ and _____ cubic meters per person per year.
a) 900 and 1000
b) 1000 and 1600
c) 500 and 1000
d) 1650 and 2650
Answer: Option (b)
7) In India _____ contributes approximately 22 percent of the total electricity produced.
a) tidal power
b) nuclear power
c) thermal power
d) hydroelectric power
Answer: option (d)
8) From ancient times, evidence of sophisticated irrigation works have also been found in Nagarjunakonda. It is located in _____.
a) Andhra Pradesh
b) Odisha
c) Karnataka
d) Tamil Nadu
Answer: Option (a)
9) In the 14th Century, the tank in _____ was constructed by Iltutmish for supplying water to the Siri Fort area.
a) Jaipur, Rajasthan
b) Hauz Khas, Delhi
c) Bhopal, Madhya Pradesh

d) Surat, Gujarat
Answer: Option (b)
10) _____ is the first state in India which has made rooftop rainwater harvesting structures compulsory to all the houses across the state.
a) Karnataka
b) Tamil Nadu
c) Maharashtra
d) Andhra Pradesh
Answer: Option (b)
11) _____ in the Mahanadi basin integrates conservation of water with flood control.
a) Krishnarajasagar project
b) Teri project
c) Hirakud project
d) Bhakra Nangal project
Answer: Option (c)
12) In the Sutlej-Beas river basin, the _____ water is being used both for hydel power production and irrigation.
a) Nagarjuna Sagar project
b) Sardar Sarovar project
c) Kallanai project
d) Bhakra – Nangal project
Answer: Option (d)
13) _____ proudly proclaimed the dams as the ‘temples of modern India’ as it would integrate the development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.
a) Sardar Patel
b) Jawaharlal Nehru
c) Mahatma Gandhi
d) Dr B.R.Ambedkar
Answer: Option (b)
14) Bhadu song in a particular region narrates the troubles faced by people owing to the flooding of _____ known as the river of sorrow.

a) Damodar river
b) Kaveri river
c) Narmada river
d) Yamuna river
Answer: Option (a)
15) Narmada Bachao Andolan is a Non-Governmental Organisation (NGO) that mobilised tribal people, farmers, environmentalists and human rights activists against the _____ dam being built across the river Narmada.
a) Sardar Sarovar
b) Tehri dam
c) Nagarjuna Sagar Dam
d) Bhakra Nangal Dam
Answer: Option (a)
16) Koyna Dam is one of the largest dams located in _____.
a) Uttar Pradesh
b) Himachal Pradesh
c) Rajasthan
d) Maharashtra
Answer: option (d)
17) Rihand Dam is located on river Rihand, a tributary of _____.
a) Sutlej river
b) Son river
c) Godavari river
d) Brahmaputra river
Answer: Option (b)
18) The Krishna-Godavari dispute is due to the objections raised by the Karnataka and Andhra Pradesh Governments regarding the diversion of more water at Koyna by the _____ Government for a multipurpose project.
a) Tamil Nadu
b) Madhya Pradesh
c) Maharashtra
d) Kerala

Answer: Option (c)
19) In Phalodi and Barmer, almost all the houses traditionally had underground tanks or tankas for storing drinking water. Barmer and Phalodi are located in _____.
a) Gujarat
b) Himachal Pradesh
c) Uttarakhand
d) Rajasthan
Answer: Option (d)
20) A 200-year-old system of tapping stream and spring water by using bamboo pipes is prevalent in the state of _____.
a) Meghalaya
b) Tripura
c) Assam
d) Arunachal Pradesh
Answer: Option (a)
Question 1.
The major source of fresh water in India is
(a) rainfall
(b) ground water
(c) atmospheric water
(d) ocean water
Answer: (b) ground water

Question 2.
Rooftop rainwater harvesting is a technique to recharge
(a) ground water
(b) river water
(c) lake water
(d) sea water
Answer: (a) ground water

Question 3.
Rana Pratap Sagar Dam is located in
(a) Odisha

(b) Uttarakhand
(c) Rajasthan
(d) Andhra Pradesh
Answer: (c) Rajasthan

Question 4.
The Narmada Bachao Andolan is associated with
(a) Sardar Sarovar Dam
(b) Tehri Dam
(c) Hirakud Dam
(d) Gandhi Sagar Dam
Answer: (a) Sardar Sarovar Dam

Question 5.
How much of earth's surface is covered with water?
(a) One-fourth
(b) Half
(c) Three-fourth
(d) Two-third
Answer: (c) Three-fourth

Question 6.
Sardar Sarovar Dam is situated on the river named
(a) Ganga
(b) Godavari
(c) Mahanadi
(d) Narmada
Answer: (d) Narmada

Question 7.
Which of the following social movements is/ are not a resistance to multi-purpose projects?
(a) Narmada Bachao Andolan
(b) Tehri Dam Andolan

(c) Navdanya
(d) Chipko Movement
Answer: (c) Navdanya

Question 8.
The remote village that has earned the rare distinction of being rich in rainwater?
(a) Gari
(b) Kaza
(c) Gendathur
(d) none of the above
Answer: (c) Gendathur

Question 9.
Bamboo drip irrigation system is prevalent in:
(a) Manipur
(b) Meghalaya
(c) Mizoram
(d) Madhya Pradesh
Answer: (b) Meghalaya

Question 10.
Underground tanks seen in Rajasthan to store rainwater for drinking is called:
(a) Tankas
(b) Khadin
(c) Ponds
(d) Kuls
Answer: (a) Tankas

Question 11.
Nagarjuna Sagar Dam is built on which river?
(a) Clenab
(b) Mahanadi

(c) Krishna
(d) Satluj
Answer: (c) Krishna

Question 12.
On which of the following rivers is Koyena dam built?
(a) Krishna
(b) Kaveri
(c) Ganga
(d) Mahanadi
Answer: (a) Krishna

Question 13.
What percentage of the total volume of world's water is estimated to exist as oceans?
(a) 94.5%
(b) 95.5%
(c) 96.5%
(d) 97.5%
Answer: (c) 96.5%

Question 14.
In which of the following regions, people built 'Guls' and 'Kuls' for irrigation?
(a) Northern Plains
(b) Western Himalayas
(c) Coastal areas
(d) None of these
Answer: (b) Western Himalayas

Question 15.
Hirakud dam is built on which river?
(a) Chenab
(b) Mahanadi

(c) Krishna
(d) Satluj
Answer: (b) Mahanadi

Question 16.
What is the contribution of hydroelectricity in the total generation of electricity?
(a) 52%
(b) 42%
(c) 32%
(d) 22%
Answer: (d) 22%

Question 17.
In which one of the following states was rooftop rainwater harvesting practised?
(a) West Bengal
(b) Haryana
(c) Rajasthan
(d) Punjab
Answer: (c) Rajasthan

Question 18.
Which of the following rivers is not having any multipurpose river project?
(a) Satluj-Beas
(b) Mahanadi
(c) Narmada
(d) Yamuna
Answer: (d) Yamuna

Question 19.
On which one of the following rivers Mettur dam is constructed?
(a) River Kaveri
(b) River Krishna

(c) River Godavari
(d) River Mahanadi
Answer: (a) River Kaveri

Question 20.
Roof tap rainwater harvesting system in Rajasthan is known as:
(a) Guls
(b) Kuls
(c) Tankas
(d) Baobs
Answer: (c) Tankas

Question 21.
Which of the following structures are known as ‘tankas’?
(a) Underground tanks for storing rainwater harvested from roof tops for drinking purpose
(b) Tanks constructed on rooftops for storing rainwater
(c) Tanks constructed in agricultural fields to store rainwater
(d) Tanks constructed to store floodwater
Answer: (a) Underground tanks for storing rainwater harvested from roof tops for drinking purpose

Question 22.
Which one of the following is not an adverse effect of dams?
(a) Interstate water disputes
(b) Excessive sedimentation of Reservoir
(c) Displacement of population
(d) Flood control
Answer: (d) Flood control

Question 23.
In which of the following states is the bamboo-drip irrigation system prevalent?
(a) Rajasthan
(b) Himachal Pradesh

(c) West Bengal
(d) Meghalaya
Answer: (d) Meghalaya

Question 24.
Due to which of the following reasons are rooftop rainwater harvesting commonly practised, particularly in Rajasthan?
(a) To store water for irrigation
(b) To keep the house cool
(c) To store drinking water
(d) To clean the rooftops
Answer: (c) To store drinking water

Question 25.
In which of the following areas are 'guls' and 'kuls' used to channel water for agriculture?
(a) Deccan Plateau
(b) Deserts of Rajasthan
(c) Western Himalayas
(d) Ganga Plains
Answer: (c) Western Himalayas

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Complete the following table:

| Name of the River Valley Project | Name of the River on which it is located | Name of the beneficiary state/states |
|---|---|---|
| (i) The Bhakra Nangal Project | | |
| (ii) The Hirakud Project | | |
| (iii) The Rihand Project | | |
| (iv) Damodar River Valley Project | | |
| (v) Sardar Sarovar Dam Project | | |

Answer:

| Name of the River Valley Project | Name of the River on which it is located | Name of the beneficiary state/states |
|---|---|---|
| (i) The Bhakra Nangal Project | Sultej-Beas river basin | Punjab, Haryana and Rajasthan |
| (ii) The Hirakud Project | Mahanadi basin | Odisha |
| (iii) The Rihand Project | Son | Uttar Pradesh and Chhattisgarh |
| (iv) Damodar River Valley Project | Damodar and its tributaries | Jharkhand and West Bengal |
| (v) Sardar Sarovar Dam Project | Narmada | Gujarat and Madhya Pradesh |

1. Drip irrigation system is a means of ……. conservation.
Answer: water

3. Today dams are built for ……. reasons.
Answer: multi-purpose

3. Different social groups do not have ……. access to water.
Answer: equal

4. Multi-purpose projects were launched in India after ……..
Answer: independence

DIRECTION : In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as :

(A) If Both assertion and reason are true and reason is the correct explanation of assertion.
(B) If Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If Assertion is true but reason is false.
(D) If Both assertion and reason are false.

Assertion : Water is a renewable resource.
Reason : Freshwater is mainly obtained from surface run off and ground water that is continually being renewed.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.
**The total volume of world's water is estimated to exist as oceans and only few cent occurs to be fresh water. Nearly 70 per cent of this freshwater occurs as ice sheets and glaciers in Antarctica, Greenland and the mountainous regions of the world.**

Assertion : The availability of water resources varies over space and time.
Reason : Availability of water resources helps in storing water.

Ans : (c) Assertion is true but reason is false.

**Water resources varies over space and time due to the variation in seasonal and annual precipitation however water scarcity in most cases is caused by over- exploitation and excessive use.**

Assertion : Dams are referred to as multi-purpose projects.
Reason : Dams are built for irrigation, electricity generation, water supply for domestic and industrial use, flood control, recreation and fish breeding.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.
**Dams were traditionally built to impound rivers and rainwater that could be used later to irrigate agricultural fields. They also help in various activities. Thus, the reason justifies the assertion.**

Assertion : Dams are only used for generating electricity, not for irrigation.
Reason : Water stored in dam does not produce electricity.

Ans : (d) Both assertion and reason are false.

**Dams are built to impound rivers and rainwater that could be used later to irrigate agricultural fields and it also helps to generate electricity and fulfills a variety of purposes at the same time. Thus, both reason and assertion are false.**

Assertion : Irrigation has also changed the cropping pattern.
Reason : Crops are now sown according to the amount and availability of water.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.
**Irrigation has also changed the cropping pattern of many regions with farmers shifting to water intensive and commercial crops. Large farmers are benefitted through changing the cropping pattern.**

Assertion : Irrigation is considered to be the major source of agriculture.
Reason : Dams are well-known for their capacity to hold water for agriculture.

Ans : (c) Assertion is true but reason is false.
**Irrigation is considered to be the major source of agriculture. The major sources of irrigation are from canals, tanks, wells and tubes but dams are used only to store large water for later use.**

Assertion : Multi-purpose projects help to control floods by regulating water flow.
Reason : Dafrisyere constructed to conserve water.

Ans : (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
**Multi-purpose projects include dam which helps us in conserving and managing water. Floods occur due to very rainfall. Building dams in most of our river basins helps in controlling floods as it**

**helps in storing and regulating water resource. Thus both are true, but the reason does not justify the answer.**

Assertion : Growing Population is the main reason for water scarcity.
Reason : Irrigation from tube wells and canals is responsible for water scarcity.

Ans : (c) Assertion is true but reason is false.
**Water is utilized on large basis because, increasing population requires more water for cooking, washing and bathing. Irrigation is not a major contributor. Thus, the assertion is true but the reason is not.**

Assertion : Ground water a highly overused resource.
Reason : Ground water is used for domestic and drinking purpose.

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.
**Ground water a highly' overused resource as it used for domestic purpose and drinking purpose. Huge population mainly depends upon the ground water for basic requirements**

**Question-1**
What is the situation regarding water scarcity in post independent India?
**Solution:**
Post-independent India witnessed intensive industrialisation and urbanisation, creating vast opportunities for us. Today, large industrial houses are as common placeas the industrial units of many MNCs(Multinational Corporations). The ever-increasing number of industries has made matters worse by exerting pressure on existing freshwater resources. Industries, apart from being heavy users of water, also require power to run them. Much of this energy comes from hydroelectric power. Today, in India hydroelectric power contributes approximately 22 per cent of the total electricity produced. Moreover,

multiplying urban centres with large and dense populations and urban lifestyles have not only added to water and energy requirements but have further aggravated the problem. If you look into the housing societies or colonies in the cities, you would find that most of these have their own groundwater pumping devices to meet their water needs.

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**Question-2:**

What are the causes of water scarcity in available areas?

**Solution:**

This scarcity may be due to bad quality of water. Lately, there has been a growing concern that even if there is ample water to meet the needs of the people, much of it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilisers used in agriculture, thus, making it hazardous for human use.

**Question-3:**

Give a short note on Multi-purpose projects In India.

**Solution:**

Multi-purpose projects, launched after Independence with their integrated water resources management approach, were thought of as the vehicle that would lead the nation to development and progress, overcoming the handicap of its colonial past. Jawaharlal Nehru proudly proclaimed the dams as the ‘temples of modern India’; the reason being that it would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

**Question-4:**

What were the different methods of traditional rain-water harvesting?

**Solution:**

There existed an extraordinary tradition of water-harvesting system. 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 the local ecological conditions and their water needs. In hill and mountainous regions, people built diversion channels like the ‘guls’or ‘kuls’ of the Western Himalayas for agriculture.

‘Rooftop rain water harvesting’was commonly practised to store drinking water, particularly in Rajasthan. In the flood plains of Bengal, people developed inundation channels to irrigate their fields. In arid an semi-arid regions, agricultural fields were converted into rain fed storage structures that allowed the water to stand and moisten the soil like the ‘khadins’ in Jaisalmer and ‘Johads’ in other parts of Rajasthan.

**Question-5:**

Give a short note on Rooftop rainwater harvesting.

**Solution:**

Rooftop harvesting was common across the towns and villages of the Thar. Rainwater that falls on the sloping roofs of houses is taken through a pipe into an underground *tanka* (circular holes in the ground).It is built in the main house or in the courtyard. Water can be taken from a neighbour’s roof through a long pipe. A hole is made through which rainwater flows down into an underground *tanka*.

**Question-6:**

State two objectives of rainwater harvesting?

**Solution:**

1.It reduces run-off of potable water back into the sea.
2.It prevents water –logging in roads during rainy season.

**Question-7:**

What are two measures of conservation of water resources?

**Solution:**

Rainwater harvesting.
Transfer of water from flood prone basins to drought prone basins.

**Question-8:**

Give four major uses of water.

**Solution:**

Drinking and domestic consumption like washing clothes.
2.Irrigation of farm lands.
3.Generation of Hydro-electricity.
4.Cooling at home and in industrial establishments.

**Question-9:**

What do you understand by underground water? Mention two areas where underground water is abundant.

**Solution:**
Water resources that lie beneath the surface of the earth is called underground water resources. These come into existence due to the seepage of ground water during rainy spells. Northernplains and coastal regions have abundant underground water. This is because the plains are flat and the rock strata are permeable.

**Question-10:**
Name any Multi-purpose projects In India and give three contributions of that project.

**Solution:**
The Damodar Valley Project offers the following advantages:
1) Power station under that project provides 104 MW of Hydro electricity.
2.The project provides 136 km of inland waterways through reservoirs and canals.
Its canals irrigate 4,50,000 hectares of agricultural land.

**Question-11:**
What is a Multi-purpose project? State two purposes, which are fulfilled by multi-purpose projects.

**Solution:**
Multi-purpose projects comprises of one or more dams erected to contain the free flow of water, storage of water in artificially created reservoirs, power house for generation of Hydro-electricity and feeder canals for irrigation.
1) They are designed to generate Hydro-electricity.
2) Store water for feeding irrigation channels.

**Question-12**
Give two reasons why precipitation is called primary source of water on earth.

**Solution:**
Precipitation causes rains. The rainwater flow into rivers that are one of the primary sources of water.
Rainwater made available by precipitation seeps into ground creating ground water reserves.

**Question-13:**

Give 2 examples of over-exploitation of water resources.

**Solution:**

Mineral water bottling plants and deep bore wells are two examples of over-exploitation of water resources.

**Question-14:**

How much of the world's water exist as fresh water?

**Solution:**

2.5 % of the world's water exists as fresh water.

**Question-15:**

Identify the sources of fresh water supply?

**Solution:**

Precipitation, surface run-off and ground water are sources of fresh water supply.

**Question-16:**

How has industrialisation affected the quality of river waters?

**Solution:**

Discharges of untreated effluents in the river by industrial units have polluted river water.

**Question-17:**

What are the social consequences of building big dams?

**Solution:**

Big dam projects cause large scale displacement of people. The displaced people have to give up their homes and their lands. The displaced people do not get the compensation they are promised by the government and are put to a lot of hardship. The advantages of the dam, such as better irrigation facilities, electricity and industrialisation are enjoyed by others, were as the displaced people are left defenceless. The dams have caused conflict between people who have been displaced and those who have benefited.

Tribal people and farmers are involved in the Narmada Bachao Andolan and Tehri Dam Andolan seeking justice for displacement.

**Question-18**

What is the situation regarding water scarcity in post independent India?

**Solution:**

Post-independent India witnessed intensive industrialisation and

urbanisation, creating vast opportunities for us. Today, large industrial houses are as common placeas the industrial units of many MNCs(Multinational Corporations). The ever-increasing number of industries has made matters worse by exerting pressure on existing freshwater resources. Industries, apart from being heavy users of water, also require power to run them. Much of this energy comes from hydroelectric power. Today, in India hydroelectric power contributes approximately 22 per cent of the total electricity produced. Moreover, multiplying urban centres with large and dense populations and urban lifestyles have not only added to water and energy requirements but have further aggravated the problem. If you look into the housing societies or colonies in the cities, you would find that most of these have their own groundwater pumping devices to meet their water needs.

**Question-19**

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# EXTTRRAAAAAA AMMUNITION

## Very Short Answer Type Questions

**1. How is freshwater obtained**

**Answer:** The freshwater is obtained from precipitation, surface run off and groundwater that is continually being renewed and recharged through the hydrological cycle.

**2. What is hydrological cycle**

**Answer:** The continuous movement of water on, above and below the surface of earth.

**3. What is the importance of hydrological cycle**

**Answer:** The freshwater is mainly obtained from surface run off and groundwater that is continually being renewed and recharged through the hydrological cycle. All water moves within the hydrological cycle ensuring that water is renewable resource.

**4. What is water scarcity**

**Answer:** Water scarcity is the lack of sufficient available water resources to meet the demand.

**5. "The availability of water resources varies over space and time". Give reasons.**

**Answer:** Water resources varies over space and time due to the variation in seasonal and annual precipitation.

**6. What percentage of the total volume of world's water is estimated to exist as oceans**

**Answer:** 96.5%

**7. How much per cent of the total volume of world's water is estimated to exist as fresh water**

**Answer:** 2.5

**8. What are the sources of fresh water?**

**Answer:** Precipitation, surface run off and groundwater.

**9. How is freshwater being renewed**

**Answer:** The freshwater is being renewed through the hydrological cycle.

**10. Mention any two regions which are expected to face water shortage.**

**Answer:** (i) Regions having low rainfall
(ii) Regions which are drought prone.

**11. What is a dam**

**Answer:** 'A dam' is a barrier across the flowing water that obstructs dissects or retards the flow, often creating a reservoir, lake or impoundment.

**12. What is a multipurpose project**

**Answer:** A multipurpose project is that which fulfils a . variety of purposes at the same time, for example – irrigation, generation of electricity, flood control, fish breeding, soil conservation etc.

**13. Who proclaimed dams as the temples of modem India**

**Answer:** Jawaharlal Nehru.

**14. Why were the multipurpose river projects considered as temples of modem India by Jawaharlal Nehru**

**Answer:** These would integrate development of agriculture and the

village economy with rapid industrialisation and growth of the urban economy.

**15. Name any two social movements which have been launched against the multipurpose projects.**

**Answer:** Narmada Bachao Andolan and 'Tehri Dam' Andolan.

**16. What was considered as a viable alternative to the multipurpose projects and why**

**Answer:** The. disadvantages and rising resistance against the multipurpose projects, has lead us to conclude that water harvesting system is a viable alternative, both socio-economically and environmentally.

**17. Irrigation has changed the cropping pattern of many regions with farmers shifting to water intensive and commercial crops". Mention its ecological consequence.**

**Answer:** Salinisation of the soil

**18. What was the primary reason for launching 'Narmada Bachao Andolan'**

**Answer:** Narmada Bachao Andolan was launched due to the large scale displacement of local communities.

**19. What is silt**

**Answer:** A fine soil which is formed in flood plains.

**20. How people used to conserve or harvest water in hills and mountainous regions**

**Answer:** By building diversion channels like the 'guts' or 'kuls'.

**21. How people used to harvest water in the flood plains of Bengal**

**Answer:** By building inundation channels to irrigate their fields.

**22. How people harvest water in the semi- arid and arid regions of Rajasthan**

**Answer:** By building underground tanks.

**23. Many people of arid and semi-arid regions construct under-ground rooms adjoining the water tanks. Give reason.**

**Answer:** By beating the summer heat it would keep the room cool.

**24. Name two techniques of roof top rain water harvesting.**

**Answer:** (i) Recharge through hand pump.

(ii) Recharge through abandoned dug well.

**25. Name any two states where roof top water harvesting is most common.**
**Answer:** Meghalaya and Rajasthan.
**26. Define the term Tankas.**
**Answer:** Tankas are the underground tanks for storing drinking water.
**27. Which is the purest form of natural water**
**Answer:** Rainwater
**28. What is Kul**
**Answer:** It is a circular village tank from which water is released and taken when required.
**29. Name any two states which are involved in Krishna-Godavari-dispute.**
**Answer:** Karanataka and Andhra Pradesh.
**30. Name the river on which the Hirakud dam is located.**
**Answer:** Mahanadi
**31. Name the river on which the Mettur dam is located.**
**Answer:** Kaveri
**32. Name the river on which the Nagarjuna Sagar dam is located.**
**Answer:** Tungabhadra
**33. Name the river on which the Rihand dam is located.**
**Answer:** Son
**34. Name the river on which the Bhakra Nangal dam is located.**
**Answer:** Satluj
**35. Name the river on which the Koyna dam is located**
**Answer:** Krishna
**36. Name the river on which the Sardar Sarovar dam is located.**
**Answer:** Narmada
**37. What is the contribution of hydroelectricity in the total generation of electricity.**
**Answer:** 22%

# Short Answer Type Questions

**1. What is hydrological cycle? What is its importance**

**Answer:** The continuous movement of water on, above and below the surface of earth is known as hydrological cycle. The freshwater is mainly obtained from surface run off and ground water that is continually being renewed and recharged through the hydrological cycle. All water moves within the hydrological cycle 5. ensuring that water is a renewable resource.

**2. How has agriculture aggravated the problem of water scarcity in India Explain.**

**Answer:** (i) Water is a basic input in agriculture. It is used for irrigation.
(ii) HYV seeds needs more water as compared to traditional seeds.
(iii) Commercialisation of agriculture has also lead to withdrawal of groundwater at a large scale.
(iv) Overuse of groundwater is another problem associated with agriculture. The water table has lowered in many parts of India due to its overuse.

**3. "Water scarcity may be an outcome of large and growing population". Justify.**

**Answer:** (i) A large population means more water not only for domestic use but also to produce more food.
(ii) Most of the Indian cities are facing the
problem of water due to growing population. .
(iii) A growing population has also a direct impact on the water level.

**4. How does urbanisation and urban lifestyle lead to over-exploitation of water resources Explain.**

**Answer:** (i) Most of our cities are over populated.
Overpopulation leads to our utilisation of water resources.
(ii) Urbanisation especially unplanned urbanisation adds to water pollution.
(iii) Urbanisation also damages the existing water resources especially the river. For example, most of Indian river have been polluted by the waste of cities.

**5. Is it possible that an area or region may have ample water resources but is still facing water scarcity Explain with the help of three relevant examples.**

**Answer:** Yes, it is possible that an area or region may have ample water resources but is still facing water scarcity. Most of our cities are facing this problem.
(i) In most of our cities there is no shortage of water but the water is unfit for consumption.
(ii) Most of our cities are in the banks of rivers, but rivers have been turned into toxic streams.
(iii) The ever increasing population, industries and vehicles has made matter worse by exerting pressure on existing freshwater resources.

**6. What is importance of water**

**Answer:** (i) Water is vital for human survival.
(ii) Water is used for transportation.
(iii) In industries water is used as a coolant.
(iv) Water is also used for power production.
(v) Water is a basic input for agriculture.

**7. How do increasing number of industries exert pressure on existing freshwater resources**

**Answer:** (i) industries used water as coolant, raw material, solvent, etc.
(ii) Industries release harmful chemicals which contaminates water.
(iii) Most of the Indian rivers are polluted due to toxic chemicals which are released by industries.

**8. What are dams? How do these help to conserve and manage water**

**Answer:** A dam is a barrier across flowing water that obstructs, directs or retards the flow often creating a reservoir, lake or impoundment.
(i) Dams were traditionally built to impound rivers and rainwater that could be used later to irrigate agricultural fields.
(ii) Dams are also source of perennial canals.

**9. Distinguish between a dam and a multipurpose project.**

**Answer:**

**Dam**

1. A dam is barrier across the flowing water that obstructs, dissects or retards the flow, often creating a reservoir, lake or an impoundment
2. It is a traditional concept.

**Multipurpose project.**

1. A multipurpose project is that which fulfils a variety of purposes at the same time, for example – irrigation, generation of electricity, flood control, fish breeding, soil conservation, etc.
2. It is a modern concept.

**10. Who proclaimed the dams as the temples of modern India Give reason.**

**Answer:** Jawaharlal Nehru proudly proclaimed the dams as the 'temples of modem India'; the reason being that it would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

**11.'Multipurpose projects and large dams have also been the cause of many social movement'. Name any two such movements. Why these movements were launched**

**Answer:** Multipurpose projects and large dams have also been the cause of many new social movements like the 'Narmada Bachao Andolan' and 'Tehri Dam Andolan' etc. Resistance to these projects has primarily been due to the large – scale displacement of local communities. Local people often had to give up their land, livelihood and their meagre access and control over resources for the greater good of the nation.

**12. How do the dams create conflicts between the people**

**Answer:** (i) The dams have created conflicts between people wanting different uses and benefits from the same water resources.

(ii) Inter-state water disputes are becoming common with regard to sharing the costs and benefits of the Projects.

(iii) The landowners, the rich farmers, industrialists and urban centres are benefitting at the cost of local communities.

In Gujarat, the Sabarmati – basin farmers were agitated and almost caused a riot over the higher priority given to water supply in urban areas, particularly during droughts. Inter – state water disputes are also becoming common with regard to sharing the costs and benefits of the multipurpose project.

**13. How has irrigation changed the cropping pattern? What is its impact on the social landscape**

**Answer:** Due to irrigation facilities many farmers have shifted to water intensive and commercial crops. For example, Punjab has become major producer of rice inspite of low rainfall.
Impact on social landscape: This transformation has widens the gap between rich and poor. The rich and mighty who can afford higher inputs has become more rich whereas the poor have failed to get benefit due to lack of capital.

**14. Explain three ways in which irrigation schemes have changed the social landscape of the region.**

**Answer:** (i) Displacement of the local people : Local people often had to give up their land, livelihood and their meagre access and control over resources for the greater good of the nation.
(ii) Social movements : Multipurpose projects and large dams have also been the cause of many new social movements like the 'Narmada Bachao Andolan' and the 'Tehri Dam Andolan', etc.
(iii) Widening the gap between rich and poor : Multipurpose projects have widened the gap between rich and poor. The landlords, large farmers and industrialist are getting benefit at the cost of poor.

**15. "Multipurpose projects have failed to achieve the purpose for which they were built". Justify by giving reasons.**

**Answer:** (i) These dams were constructed to control floods but they have triggered floods due to sedimentation in the reservoir.
(ii) Moreover, the big dams have mostly been unsuccessful in controlling floods at the time of excessive rainfall.
(iii) Many a time authorities are forced to release water from dams during heavy rainfall.

**16. What is rainwater harvesting What is its importance**

**Answer:** It is a technique of increasing the recharge of ground water by capturing and storing rainwater by constructing structures such as percolating pits, check dams, etc.
Importance:-
(i) Rainwater harvesting is the need of hour as demand for water is increasing day by day.
(ii) Rainwater harvesting reduces pressure on existing water resources.
(iii) It is cheap source of water supply.

(iv) It helps in recharging groundwater.
(v) The rainwater store is extremely reliable source of drinking water when all other sources are dried up.

**17. (i) What is a multipurpose project**

**Answer:** (i) A multipurpose project is that which fulfils a variety of purposes at the same time, for example – irrigation, generation of electricity, flood control, fish breeding, soil conservation, etc.
(ii) It would integrate development of agriculture and the village economy with rapid industrialisation and the growth of urban economy.

**18. Explain the rooftop rainwater harvesting technique.**

**Answer:** (i) Rooftop rainwater is collected using a PVC pipe.
(ii) Collected water is filtered using sand and bricks.
(iii) Underground pipe is used to take the water to the sump for immediate usage.
(iv) Excess water from the sump is taken to the well.
(v) Water from the well recharges the underground water.

**19. Why are different water harvesting systems considered a viable alternative both socio economically and environmentally in a country like India**

**Answer:** (i) Water harvesting is a very cheap and affordable method of conservation of water.
(ii) Indian people have in-depth knowledge of rainfall regime and soil type. They have developed techniques to harvest rainwater, groundwater, rain water and flood water in keeping with the local ecological conditions and their water needs.
(iii) Rainwater harvesting techniques are more environmental friendly as compare to multipurpose river projects.

# Long Answer Type Questions

**1. How have the growing population, industrialisation and urbanisation led to water scarcity Explain.[CBSE 2008 (D)]**

**Answer:** (i) Growing population : Growing population is one of the

basic factors which is responsible for the scarcity of water. Most of our cities are facing this problem due to overpopulation. A large population means more water not only for domestic use but also to produce more food.
(ii) Commercialisation of agriculture : After the success of Green Revolution, our farmers are producing commercial crops. The commercial crops need more water and other inputs. Assured means of irrigation like tube wells and wells are responsible for the falling groundwater levels.
(iii) Industrialisation : The post independent India witnessed intensive industrialisation and urbanisation. Today, large industrial houses are common in the form of industrial units of many MNCs (Multinational Corporations). The ever increasing number of industries has made matters worse by exerting pressure on the existing freshwater resources. Industries, apart from being heavy users of water, also require power to run them. Much of this energy comes from the hydroelectric power.
(iv) Urbanisation : Urbanisation has also aggravated the problem of water scarcity. Most of our cities are overpopulated. Overpopulation leads to over- utilisation of the water resources, and also pollutes the existing resources.

**2. How do the multipurpose river projects affect the aquatic life Explain.**

**Answer:** In recent years, the multi-purpose projects and large dams have come under great scrutiny and opposition for a variety of reasons :
(i) Regulating and damming of rivers affect their natural flow causing poor sediment flow and excessive sedimentation at the bottom of the reservoir, resulting in rockier streambeds and poorer habitats for the rivers, as well as the aquatic life.
(ii) Dams also fragment rivers making it difficult for the aquatic fauna to migrate, especially for spawning.
(iii) The reservoirs that are created on the flood. Plains also submerge the existing vegetation and soil leading to its decomposition over time.
(iv) Irrigation has also changed the cropping pattern of many regions with farmers shifting to water intensive and commercial crops. This has great ecological consequences like salinisation of the soil.

**3. Explain the quantitative and qualitative aspects of water scarcity.**
**Answer:** (i) Quantitative aspect : This aspect is related to the availability of water resources. The availability of water resources varies over space and time mainly due to variations in seasonal and annual precipitation. However, water scarcity in most cases is caused by over-exploitation, excessive use and unequal access to water among different social groups.
(ii) Qualitative aspect : Now, let us consider another situation where water is sufficiently available to meet the needs of the people, but, the area still suffers from water scarcity. This scarcity may be due to bad quality of water. Lately, there has been a growing concern that even if there is ample water to meet the needs of the people, much of it may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilizers used in agriculture, thus, making it hazardous for human use.
**4. Why is there an urgent need to conserve and manage our water resources Mention three reasons.**
**Answer:** (i) Precondition for life : Water is necessary for life on earth. It is believed that life originated in water before it invaded land. Water is in fact a precondition of life.
(ii) Water essential for crops: Cultivation of crops depends on the availability of water. Water dissolves minerals and other nutrients in the ground. The roots of the plants draw this nutritious water for the soil. India is an agricultural country so availability of water is a must.
(iii) Water and industries : Industries need water as coolant, solvent, raw material, etc.
(iv) Water for daily life : Water is also used for drinking and domestic consumption. The growing urbanisation with its modern lifestyle has been demanding greater share of water day by day.
(v) Water an important component of ecosystem : Conservation of water is also important to prevent degradation of our natural ecosystems.
(vi) Water scarcity : It is essential to conserve and manage water because its overuse and misuse has lead to water scarcity.
**5. Examine the importance of the river valley projects in the development of hydel power and irrigational facilities in India.**

**Answer:** (i) Generation of Power (electricity) :
These multipurpose projects are the main source of power generation. According to the Economic Survey, 2013, these produce more than 39,788.40 MW power. They provide us neat, pollution free and cheapest energy which is the backbone of industry and agriculture.
(ii) Flood Control : These projects control the floods because water can be stored in them. These projects have converted many 'rivers of sorrows' into 'rivers of boon'. For example, the river Kosi.
(iii) Soil Conservation : They help to conserve the soil because they slow down the speed of water.
(iv) Irrigation : These projects are the main source of irrigation for our country. These irrigate the fields during the dry seasons. Many perennial canals have been dug and they irrigate dry areas.

**6. "In recent years, the multipurpose projects and large dams have come under great scrutiny." Give reasons.**

**Answer:** (i) Adverse effect on the fertility of the soil : Due to the construction of dams, there are no annual floods in the river. And because of this, the soil of the downstream region does not get nutrient rich "silt". This decreases the fertility of the soil.
(ii) Adverse impact on aquatic life: Due to the construction of dams on the rivers, the fish in the downstream area do not get sufficient nutrient material. Regulating and damming of rivers affect the natural flow of water causing poor sediment flow downward, and excessive sedimentation at the bottom of reservoir, resulting in rockier stream beds and poorer habitats for the rivers aquatic life. Dams also fragment rivers making it difficult for aquatic fauna to migrate for spawning i.e., to produce eggs.
(iii) Displacement of local communities : The building of large dams results in displacement of local communities. The local people often have to give up their land and livelihood and their meagre access and control over resources for the greater food of the nation.
(iv) Change in the cropping pattern : The multipurpose projects are responsible for providing assured means of irrigation to farmers. Due to this, most of the farmers have changed the cropping pattern shifting to

water intensive and commercial crops. This has led to salinisation of soil leading to ecological imbalance.

# HOTS Questions and Answers

**1. Write the features of the 'tankas' built in the houses of Bikaner, Phalodi and Banner.**

**Answer:** (i) The tanks could be as large as a big room;
one household in Phalodi had a tank that was 6.1 meters deep, 4.27 meters long and 2.44 meters wide.
(ii) The tankas were part of the well-developed rooftop rainwater harvesting system and were built inside the main house or the courtyard.
(iii) They were connected to the sloping roofs of the houses through a pipe.
(itv) Rain falling on the rooftops would travel down the pipe and was stored in these underground tankas.
(v) The first spell of rain was usually not collected as this would clean the roofs and the pipes. The rainwater from the subsequent showers was then collected.

**2. Explain the term 'tankas'. Where were tankas built in India**

**Answer:** (i) The tankas were part of the well-developed rooftop rainwater harvesting system and were built inside the main house or the courtyard. They are built for storing drinking water. A tank could be 6.1 meters deep, 4.27 meters long and 2.44 meters wide.
(ii) The tankas were built in the semi-arid and arid regions of Rajasthan, particularly in Bikaner, Phalodi and Barmer.

**3. What is bamboo drip irrigation Mention any two features of it.**

**Answer:** (1) (i) About 18-20 liters of water enters the bamboo pipe system, get transported over hundreds of meters and finally reduces to 20-80 drops per minute at the site of the plant.
(ii) Bamboo drip irrigation system is practiced in Meghalaya.
(2) Features of bamboo drip irrigation ;
(i) Bamboo drip irrigation system is 200 year old system of tapping stream and stripwater by using bamboo pipe.
(ii) Bamboo pipes are used to divert perennial springs on the hilltops to the lower reaches by gravity.

(iii) The channel sections, made of bamboo, divert water to the plant site where it is distributed into branches.

**4. What role do "Guls" or "Kuls" of the Western Himalayas and "Khadin" and "Johads" in parts of Rajasthan play Describe.**

**Answer:** (i) In Western Himalayas people build diversion channels like 'guls' or 'kuls'.

(ii) In arid and semi-arid regions, agricultural fields were converted into rain-fed storage structures.

(iii) These allowed the water to stand and moisten the soil like the 'Khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

**5. "Need of the hour is to conserve and manage our water resources." Mention any four reasons. Suggest any two ways to conserve water.**

**Answer:** (i) To safeguard ourselves from health hazards.

(ii) To ensure food security.

(iii) To prevent degradation of our natural ecosystem.

(iv) To save the future generations from water crisis.

Suggestions : –

(i) Turn off the tap while brushing.

(ii) We should spread awareness regarding water conservation.

(iii) Rainwater harvesting.

**6. How is industrialisation responsible for water scarcity? Explain. Suggest any two ways to check water pollution.**

**Answer:** (i) The ever increasing number of industries has made matter worse by exerting pressure on the existing freshwater resources.

(ii) Industries need power which is produced from water. The power is produced by the multipurpose projects.

(iii) Chemicals and gases released by industries also pollutes the water.

Suggestions :

(i) Minimising use of soaps and detergents.

(ii) Minimising use of fertilizers.

**7. What is water scarcity? Mention any four factors responsible for water scarcity.**

**Answer:** Shortage of water as compared to its demand is known as water scarcity.

Factors responsible :
(i) Overexploitation of water sources.
(ii) Improper management.
(iii) Unequal access of water among different social groups.
(iv) Industrialisation and urbanisation.

**8. "Overpopulation or large and growing population can lead to water scarcity." Explain. Mention any two lessons which you have learnt from this.**

**Answer:** Overpopulation or large and growing population can lead to water scarcity as :
(i) More population means more demand for water.
(ii) A large population means more water not only for domestic use but also to produce more food.
(iii) To facilitate higher foodgrain production, water resources are being over exploited to expand the irrigated areas and the dry season agriculture.
(iv) Overutilisation of water results in lowering of the groundwater levels.
Lessons :
(i) There is need to check the growth of population.
(ii) Human beings need to care for nature.

**9. 'Large multipurpose projects also lead to land degradation.' Explain.**

**Answer:** Multipurpose projects lead to land degradation because :
(i) Irrigation has changed the cropping pattern of many regions with farmers shifting to water intensive crops. This has led to the salinisation of the soil.
(ii) Regulating and damming of rivers affect the natural flow of rivers causing poor sediment flow.
(iii) The flood plains are deprived of silt.
(iv) Multipurpose projects induce pollution which leads to land degradation.

**10. Explain various problems associated with poor people due to construction of large dams.**

**Answer:** (i) Construction of large dams leads to the large-scale displacement of the local communities.
(ii) Local people have to give up their land and livelihood.
(ii) Pbor people lose meagre access and control over resources for the greater good of the nation.
(iv) The displaced people do not get full rehabilitation facilities from the government,
(v) The landless people have to work as labourers in factories or construction sites. Their lives become miserable.

**11. Name any two movements that have been started to oppose multipurpose projects. Who are benefitted from such projects**

**Answer:** (1) Two movements that have been started to oppose multipurpose projects are:
(i) Narmada Bachao Andolan was started against the Sardar Sarovar Dam being
built across the Narmada river in Gujarat.
(ii) Tehri Dam Andolan – Resistance to these projects has primarily been due to the large-scale displacement of local communities.
(2) The landowners and large farmers, industrialists and a few urban centers are benefitted from such projects.

**12. Why is rooftop rainwater harvesting important in Rajasthan Explain.**

**Answer:** (i) The rainwater stored in tankas is an extremely reliable source of drinking water when all other sources are dried up.
(ii) Rainwater is considered the purest form of natural water.
(iii) Many houses constructed underground rooms adjoining the tanka to beat the summer heat as it would keep the room cool.
(iv) There is lack of perennial rivers in Rajasthan.
(v) The rainfall is not reliable in this region.

# ONE MARKERS

**Question 1.**
What kind of resource is water

**Answer:**
Renewable resource.
**Question 2.**
How much world's water exists as oceans and fresh water ?
**Answer:**
As oceans – 96.5 per cent.
As freshwater – 2.5 per cent.
**Question 3.**
Which are the sources of freshwater ?
**Answer:**
Precipitation
Surface run off
Groundwater.
**Question 4.**
Which is the major source of freshwater in India ?
**Answer:**
Groundwater.
**Question 5.**
Mention two causes of water scarcity.
**Answer:**
Rapid growth of population.
Uneven distribution of water resources.
**Question 6.**
How much hydroelectric power is produced in India ?
**Answer:**
In India hydroelectric power contributes approximately 22 per cent of the total electricity produced.
**Question 7.**
State any one reason for conservation of water resources.
**Answer:**
To ensure food security because water is needed for production of crops.
**Question 8.**
State any two sources from which freshwater can be obtained under the hydrological cycle.
**Answer:**

Precipitation.
Ground water.

**Question 9.**
In whose kingdom in ancient India, dams and lakes were built ?
**Answer:**
During the time of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built.

**Question 10.**
What is a dam ?
**Answer:**
A dam is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir, lake or impoundment.

**Question 11.**
How dams are classified on the basis of structure and the material used ?
**Answer:**
Based on structure and the material used, dams are classified as timber dams, embankment dams or masonry dams with several subtypes.

**Question 12.**
What did Nehru say about dams and why ?
**Answer:**
Jawaharlal Nehru proudly proclaimed the dams as the ‘temples of modern India’ because the dams would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

**Question 13.**
Which project has been constructed in the Satluj-Beas River Basin ?
**Answer:**
Bhakra-Nangal Project has been constructed in the Satluj-Beas river basin.

**Question 14.**
Where is the Hirakud Project and what is its advantage ?
**Answer:**
The Hirakud Project is in the Mahanadi basin. It integrates conservation of water with flood control.

**Question 15.**
Why multi-purpose projects and large dams have been opposed ? State one reason.
**Answer:**
These projects and dams have been opposed because they lead to the large scale displacement of local people and communities. They have to give up their land and livelihood and their meager access to resources.
**Question 16.**
Which river is called as 'river of sorrow' ?
**Answer:**
Damodar River.
**Question 17.**
In which state the farmers were agitated over the higher priority given to the water supply in
urban areas ?
**Answer:**
In Gujarat, the Sabarmati basin farmers were agitated and almost caused a riot over the higher priority given to water supply in urban areas, particularly during droughts.
**Question 18.**
Which state governments have raised objections over the diversion of more water and where ?
**Answer:**
Karnataka and Andhra Pradesh governments have raised objections regarding the diversion of more water of Koyna by the Maharashtra government for a multi-purpose project. The reason was that this would reduce downstream flow in their states with adverse consequences for agriculture and industry.
**Question 19.**
Why the dams have triggered floods ?
**Answer:**
The dams have triggered floods due to sedimentation in the reservoir.
**Question 20.**
Which are the two social movements that have been started against

multi-purpose projects ?

**Answer:**

Narmada BachaoAndolan.

Tehri Dam Andolan.

**Question 21.**

On which river Salal Dam is built ?

**Answer:**

River Chenab.

**Question 22.**

Who gets benefits from multi-purpose projects ? State any two sections of society

**Answer:**

Land owners

Large farmers

Industrialists.

**Question 23.**

What is an ecological consequence of irrigation under multi-purpose projects ?

**Answer:**

Salinisation of the soil that has transformed the social landscape i.e., increasing the social gap between the richer landowners and the landless poor.

**Question 24.**

What was the position of rainwater harvesting system in ancient India ?

**Answer:**

In ancient India, along with the sophisticated hydraulic structures, there existed an extraordinary tradition of water harvesting system.

**Question 25.**

Give any one example of rainwater harvesting system in ancient India.

**Answer:**

In the hill and mountainous region, people built diversion channels like the ‘guls’ or ‘kuls’ of the Western Himalayas for agriculture.

**Question 26.**

What method was developed in the flood plains of Bengal to irrigate their fields ?

**Answer:**
In the floodplain of Bengal, people developed inundation channels to irrigate their fields.

**Question 27.**
Which methods were used in arid and semi-arid regions for irrigation ?

**Answer:**
In arid and semi-arid regions, agricultural fields were converted into rain fed storage structures that allowed the water to stand and moisten the soil like the 'khadins' in Jaisalmer and 'Johads' in other parts of Rajasthan.

**Question 28.**
What are tankas ?

**Answer:**
Tankas are underground tanks for storing drinking water.

**Question 29.**
What was length and breadth of a tank in Phalodi ?

**Answer:**
Length : 4.27 meters
Width : 2.44 meters
Depth : 6.1 meters

**Question 30.**
What is remarkable about Gendathur a remote backward village in Mysore ?

**Answer:**
Nearly 200 households have installed rooftop rainwater harvesting system to meet r their water needs. The village has earned the rare distinction of being rich in rainwater.

**Question 31.**
What makes Tamil Nadu to stand out with regard to rainwater harvesting ?

**Answer:**
Tamil Nadu is the first and the only state in India which has made rooftop rainwater harvesting structure compulsory to all the houses across the state.

**Question 32.**
Which system of tapping stream water is prevalent in Meghalaya ?
**Answer:**
In Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes is prevalent.

# QUESTIONS OF 3/5 MARKS

**Answers should be in about 80/100 words.**

**Question 1.**
Give some facts and figures about water in the world.
**Answer:**
**Some facts and figures about water are given below :**
96.5 per cent of the total volume of world's water exists as oceans.
2.5 per cent of the total volume of world's water exists as freshwater. 70 per cent of the fresh water occurs as ice-sheets and glaciers in Antarctica, Greenland and the mountainous
regions of the world. Only less than 30 per cent is stored as groundwater in the world's aquifers.
The total renewable water resources of India are estimated at 1,897 sq. km per annum.
India receives nearly 4 per cent of the global precipitation and ranks 133 in the world r in terms of water availability per person per annum.
By 2025, it is predicted that large parts of India will join countries or regions having absolute water scarcity.
**Question 2.**
In Israel average annual rainfall is 25 cm but there is no shortage of water but in India, average rainfall is 114 cm but here we find drought in one region or the other every year. Why ?
**Answer:**
In Israel large scale projects to desalinate sea water, direct water from rivers and reservoirs in the north, make optimal use of groundwater and reclaim flood overflow and sewage have been undertaken. On the other

hand, in India there is no proper arrangement of using rainwater. As a result of it, most of the water flows in to drains and to the sea. The rainy season is only for three months. Thereafter there is no rain for remaining nine months. As a result of these conditions we, in India, face shortage of water.

**Question 3.**

Explain three causes of water scarcity.

**Answer:**

**The statement means that there are various reasons for the scarcity of water as mentioned below :**

Over-exploitation

Excessive use

Unequal access of water among different social groups.

**Question 4.**

Is it possible that an area or region may have ample water resources but is still facing water scarcity ? Explain with the help of three relevant examples.

**Answer:**

It is possible that an area or region may have ample water resources, but is still facing water scarcity.

Such scarcity may be due to bad quality of water. The available water may be polluted by domestic and industrial wastes, chemicals, pesticides and fertilisers used in agriculture, thus making it harmful for human use.

Growing population and consequent greater demands for water.

Own wells/tubewells and falling groundwater level affecting water availability.

**Question 5.**

Why is it important to conserve and manage our water resources ? Give any three reasons.

**Answer:**

**It is necessary to conserve and manage our water resources due to the following reasons :**

**To safeguard ourselves from health hazards :** Polluted water is not good for health. It may cause various kinds of water borne diseases. Water polluted by domestic and industrial wastes, chemicals, pesticides and fertilisers makes it hazardous for human use.

**To ensure food security :** Sufficient water is required for growing crops to meet the food requirement in the country. Shortage of water may lead to condition of drought and failure of crops.

**To prevent degradation of our natural ecosystems :** Over exploitation and mismanage¬ment of water resources will impoverish this resource and cause ecological crisis that may have profound impact on our lives.

We cannot imagine a life without water. Thus it is very necessary to conserve and manage our water without which there can be no life on earth.

**Question 6.**

How was the water conserved in ancient India ? Give some examples in support of your answer.

**Answer:**

The water was conserved in ancient India by constructing sophisticated hydraulic structures like dams built of stone rubble, reservoirs or lakes, embankments and canals for irrigation.

**Some of the hydraulic structures in ancient India were as follows :**

In the first century B.C., Sringaverapura near Allahabad, had sophisticated water harvesting system channelling the flood water of the river Ganga.

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

Irrigation works have been found in many places viz., Kalinga (Orissa), Nagarjunakonda (Andhra Pradesh), Bennur (Karnataka) and Kolhapur (Maharashtra).

In the 11th century, Bhopal Lake was built. It was one of the largest artificial lakes of its time.

In the 14th century, the tank in Hauz Khas, Delhi was constructed by Iltutmish. It supplied water to Siri Fort area.

**Question 7.**

Name any two multipurpose projects of India. State four objectives of

multipurpose projects.

**Answer:**

**(1)**

Bhakra-Nangal Project in the Satluj-Beas river basin.

Hirakud Project in the Mahanadi basin.

**(2) Four objectives of multipurpose projects are as given below :**

Electricity generation

Irrigation

Flood control

Inland navigation

Fish breeding.

**Question 8.**

What is a dam ? How are they classified ?

**Answer:**

**(1)** A dam is a barrier across flowing water that obstructs, directs or retards the flow, often creating a reservoir, lake or impoundment. It has a section called a spillway or weir over which or through which water flows intermittently or continuously.

**(2)** Based on structure and the materials used, dams are classified as timber dams, embankment dams or masonry dams.

According to the height, dams can be categorised as large dams and major dams or alternatively as low dams, medium height dams and high dams.

**Question 9.**

Describe the factors that are responsible for the poor condition of India's rivers – both smaller and big rivers.

**Answer:**

**The following factors are responsible for the poor condition of India's rivers :**

**(1) Smaller rivers :**

The growing domestic, municipal, industrial and agricultural demand it water from rivers has affected the quality of water. The volume of rivers has been reduced as more and more water is being drained out of them. A heavy load of untreated sewage and industrial effluents are emptied into the rivers. This also affects the self-cleansing capacity of the rivers

leading to rising pollution of their water. As a result of above factors, the smaller rivers have all turned into toxic streams.

**(2) Big rivers : These rivers have been affected by the following factors :**

Population growth

Agricultural modernisation

Urbanisation

**Industrialisation :** Industries are heavy users of water and also require hydroelectric power to run them.

For example in Delhi, a large amount of domestic and industrial waste falls in the Yamuna river that leads to water pollution. Thus, even the big"rivers like the Ganga and Yamuna are far from being pure and efforts are being made to clean the rivers.

**Question 10.**

What is a multi-purpose river project ? Give four objectives of these projects ?

**Answer:**

**(1)** Dams are referred to as multi-purpose projects where the many uses of the impounded water are integrated with one another. Dams are now built not just for irrigation but for electricity generation, water supply for domestic and industrial uses, flood control and recreation.

**(2) The objectives of the projects were as mentioned below :**

It would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy. It was thought that they would lead the nation to development and progress, overcoming the handicap of its colonial past.

These projects generate hydro-electricity. For example the Bhakra-Nangal project water is being used for hydel power production.

The projects are useful for irrigation as is the case of Bhakra project.

**Flood control :** These projects help in the control of floods. For example the Hirakud project in the Mahanadi basin integrates conservation of water with flood control.

The other objectives are navigation, fish breeding, water supply for domestic and industrial uses and to encourage tourism.

**Question 11.**
Describe the factors that are responsible for the various objections against the multi-purpose projects.
**Answer:**
**The factors that are responsible for the various objections against the various multi-purpose projects are as given below :**
Failure of the projects to achieve their objectives.
Some dams that were constructed to control floods were responsible for the floods due to sedimentation in the reservoir.
Generally, big dams are not successful in controlling flood at the time of heavy and excessive rainfall because in such cases the release of water from dams aggravated the flood situation. This has happened in Maharashtra and Gujarat in 2006. The floods have not only devastated life and property but also caused extensive soil erosion.
Sedimentation deprived flood plains of silt, a natural fertiliser and was responsible for land degradation.
Multi-purpose projects induce earthquakes, cause water-borne diseases and pests and pollution resulting from excessive use of water.
**Question 12.**
What is rainwater harvesting ? How was it used in ancient times ?
**Answer:**
**(1)** Rainwater harvesting is a technique of increasing the recharge of groundwater by capturing and storing rainwater by constructing structures, such as dugwells, percolation pits, checkdams.
**(2)** Keeping into view the disadvantages and rising resistance against the multi-purpose projects, water harvesting system is considered a viable alternative both socio-economically and environmentally.
**(3) Ancient Times :**
In ancient India, along with the sophisticated hydraulic structures, there existed an extraordinary tradition of water-harvesting system.
People had in-depth knowledge of rainfall regimes and soil types.
They had developed wide ranging techniques to harvest rainwater, groundwater, river water and flood water in keeping with the local ecological conditions and their water needs.

In hilly and mountainous regions, people built diversion channels like the ‘guls’ or ‘kuls’ of the western Himalayas for agriculture. Rooftop rainwater harvesting wras commonly practised to store drinking water.
In the flood plains of Bengal, people developed inundation channels to irrigate their fields.
In arid and semi-arid regions, agricultural fields were converted into rain fed storage structures that allowed the water to stand and moisten the soil like the ‘Khadins’ in Jaisalmer and ‘Johads’ in other parts of Rajasthan.
In Bikaner, Phalodi and Barmer, almost all the houses had underground tanks for storing drinking water.

**Question 13.**
What is rooftop rainwater harvesting system ? In which state is it compulsory to follow this system ?
**Answer:**
**(1)** Rooftop rainwater harvesting means the rainwater that falls on the sloping roofs of houses is taken through pipe into an underground tanka (circular holes in the ground), built in the main house or in the courtyard.
**(2)** In the semi-arid and arid regions of Rajasthan, particularly Bikaner, this practice was followed.
**(3)**
Roof top rainwater harvesting is the most common practice in Shillong, Meghalaya.
Tamil Nadu is the first and the only state in India which has made rooftop rainwater harvesting structure compulsory to all the houses across the state. There are legal provisions to punish the defaulters.

**Question 14.**
What is Bamboo Drip Irrigation system ?
**Answer:**
In Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes is prevalent. About 10-20 litres of water enters the bamboo pipe system, gets transported over hundreds of meters, and finally reduced to 20-80 drops per minute at the site of the plant.

Bamboo pipes are used to divert perennial springs on the hilltops to the lower reaches by gravity.

**MAP QUESTION**

**Question 1.**

**On the map of India show the following multi-purpose projects :**

(1) Bhakra-Nangal
(2) Hirakud
(3) Nagarjunasagar
(4) Tungabhadra
(5) Sardar Sarovar.

**Answer:**

**See map given below :**


INDIA
MAJOR RIVERS AND DAMS
Wular Lake
R. Indus
R. Indus
R. Jhelum
R. Chenab
R. Ravi
R. Byas
R. Satluj
Bhakra-Nangal Project
R. Satluj
R. Ghaggar
R. Yamuna
Indira Gandhi Canal
Sambhar Salt Lake
R. Luni
R. Banas
R. Chambal
R. Parbati
R. Betwa
R. Sarda
R. Ganga
R. Gomati
R. Ghaghara
R. Gandak
R. Kosi
R. Tsangpo.
R. Lohit
R. Brahmaputra
R. Ganga
R. Son
Gandhi Sagar
R. Damodar
Damodar Valley Project
R. Brahmani
R. Mahanadi
Hirakud
Gulf of Kachh
R. Sabarmati
R. Mahi
Sardar Sarovar
R. Narmada
R. Tapi
R. Kali Sindh
R. Vaigai
R. Penganga
R. Godavari
R. Manjra
R. Indravati
R. Godavari
Chilika Lake
Gulf of Khambhat
ARABIAN SEA
BAY OF BENGAL
R. Bhima
R. Krishna
Nagarjunasagar
Kolleru Lake
R. Tungabhadra
R. Hagori
R. Paneru
Buckingham Canal
Pulicat Lake
R. Kaveri
R. Palar
LAKSHADWEEP (INDIA)
Vembanad Lake
R. Vaigai
Pak Jal Sandhi
Gulf of Mannar
ANDAMAN AND NICOBAR ISLANDS (INDIA)
ANDAMAN SEA
INDIAN OCEAN