CBSE CLASS X

Social Science (087)

ANSWER KEY

AI-generated question paper

Code: 8HY8QQ	Questions: 34	Maximum Marks: 72	Generated: 2026-06-26 09:59

SELECTIONS USED

Subject	Social Science
Lessons	3 Water Resources
Level of understanding	Exam-ready
Question selection	CBSE board paper, whole lesson (~80 marks across Sections A-E)
Model	claude-sonnet-4-6

Composition — Difficulty: 12 straightforward · 16 medium · 6 deep | Types: 13 MCQ · 6 Short · 5 Very short · 4 Assertion–reason · 3 Long · 3 Case-based | Sections: A 17Q/17m · B 5Q/10m · C 6Q/18m · D 3Q/15m · E 3Q/12m

Q1. straightforward exam-ready **[1]**

Which of the following is the largest consumer of freshwater?
(A) Domestic use
(B) Industrial use
(C) Irrigated agriculture
(D) Hydroelectric power generation

A Domestic use
B Industrial use
C Irrigated agriculture
D Hydroelectric power generation

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Model Answer

(C) Irrigated agriculture

Irrigated agriculture is the largest consumer of freshwater, as water resources are over-exploited to expand irrigated areas for dry-season agriculture and higher food-grain production.

Source: Water Scarcity and the Need for Water Conservation and Management, Chapter 3

Explanation

The textbook explicitly states: *"Irrigated agriculture is the largest consumer of water."* This is a direct, factual line — quote it or closely paraphrase it. Domestic and industrial use are significant but secondary. Hydroelectric power generation uses water but is non-consumptive. Examiners expect option **(C)** with a one-line justification.

Q2. straightforward exam-ready **[1]**

[mcq] Jawaharlal Nehru proclaimed large dams as the 'temples of modern India'. Which of the following best explains the vision behind this statement?

(A) Dams would preserve ancient hydraulic traditions and revive cultural heritage

(B) Dams would promote rapid industrialisation, urban growth and agricultural development simultaneously

(C) Dams would replace all traditional water harvesting methods across India

(D) Dams would permanently resolve inter-state water disputes

A Preserve ancient hydraulic traditions

B Integrate agricultural and village economy with rapid industrialisation and urban growth

C Replace all traditional water harvesting methods

D Solve inter-state water disputes permanently

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Model Answer

(B) Dams would integrate development of agriculture and the village economy with rapid industrialisation and growth of the urban economy.

Source: Multi-purpose River Projects and Integrated Water Resources Management, Chapter 3

Explanation

The textbook directly states: "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." Option B captures this exactly. Options A, C, and D are not supported by the passage.

Q3. straightforward exam-ready **[1]**

The Bhakra–Nangal project is located on which river basin?
(A) Mahanadi
(B) Narmada
(C) Sutluj–Beas
(D) Damodar

A Mahanadi
B Narmada
C Sutluj–Beas
D Damodar

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Model Answer

(C) Sutluj–Beas

The Bhakra–Nangal project is located on the **Sutluj-Beas river basin**, where its water is used for hydel power production and irrigation.

Source: Water Resources, Chapter 3

Explanation

The passage explicitly states: *"in the Sutluj-Beas river basin, the Bhakra–Nangal project water is being used both for hydel power production and irrigation."* Common distractor is Damodar (associated with DVC) or Mahanadi (Hirakud Dam). Remember: **Bhakra-Nangal → Sutluj-Beas; Hirakud → Mahanadi**.

Q4. straightforward exam-ready **[1]**

[mcq] Which river is dammed by the Hirakud project, one of India's earliest post-Independence multi-purpose river valley projects?
(A) Damodar
(B) Narmada
(C) Mahanadi
(D) Krishna

A Damodar
B Narmada
C Mahanadi
D Krishna

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Model Answer

(C) Mahanadi

The Hirakud project is built on the **Mahanadi** basin, where it integrates conservation of water with flood control.

Source: Water Resources, Chapter 3

Explanation

The passage explicitly states: *"the Hirakud project in the Mahanadi basin integrates conservation of water with flood control."* Students often confuse it with the Damodar Valley Project (Damodar river) or Bhakra-Nangal (Sutluj-Beas). Remember: **Hirakud = Mahanadi**.

Q5. straightforward exam-ready **[1]**

In the semi-arid and arid regions of Rajasthan, the underground tanks used for storing drinking water are locally known as:

(A) Kuls
(B) Khadins
(C) Tankas
(D) Johads

A Kuls
B Khadins
C Tankas
D Johads

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Model Answer

(C) Tankas

Explanation

The passage clearly states that in semi-arid and arid regions of Rajasthan (Bikaner, Phalodi, Barmer), houses traditionally had underground tanks called **tankas** for storing drinking water. Kuls/Guls are diversion channels in Western Himalayas; Khadins and Johads are rainwater storage structures for agriculture in Rajasthan, not drinking water tanks.

Q6. straightforward exam-ready **[1]**

Which state was the first in India to make rooftop rainwater harvesting compulsory for all houses, with legal provisions to punish defaulters?

(A) Karnataka
(B) Rajasthan
(C) Meghalaya
(D) Tamil Nadu

A Karnataka
B Rajasthan
C Meghalaya
D Tamil Nadu

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Model Answer

(D) Tamil Nadu

Tamil Nadu is the first state in India to make rooftop rainwater harvesting compulsory for all houses, with legal provisions to punish defaulters.

Source: Rainwater Harvesting, Chapter 3

Explanation

The passage explicitly states: *"Tamil Nadu is the first 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."* Students sometimes confuse this with Rajasthan (famous for traditional harvesting) or Meghalaya (highest practice in Shillong). The answer is directly quoted in the textbook, so memorise this fact precisely.

Q7. straightforward exam-ready **[1]**

The diversion channels called 'guls' or 'kuls' used for agriculture are associated with which region?
(A) Arid plains of Rajasthan
(B) Flood plains of Bengal
(C) Western Himalayas
(D) Deccan Plateau

A Arid plains of Rajasthan
B Flood plains of Bengal
C Western Himalayas
D Deccan Plateau

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Model Answer

(C) Western Himalayas

Explanation

The passage directly states: "In hill and mountainous regions, people built diversion channels like the 'guls' or 'kuls' of the Western Himalayas for agriculture." This is a direct fact-based MCQ — students must not confuse it with other regional water harvesting methods like *khadins/johads* (Rajasthan) or inundation channels (Bengal).

Q8. straightforward exam-ready **[1]**

[mcq] In the arid districts of Rajasthan, 'palar pani' is traditionally regarded as:
(A) The most polluted form of water, suitable only after filtering
(B) Groundwater tapped through underground tankas
(C) The purest form of natural water, collected and stored for drinking
(D) A type of canal water distributed through the Indira Gandhi Canal

A The most polluted form of water
B Suitable only for irrigation
C The purest form of natural water
D Less reliable than groundwater

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Model Answer

(C) The purest form of natural water

Rainwater, referred to as *palar pani* in arid Rajasthan, is considered the purest form of natural water and is collected in underground *tankas* for drinking.

Source: *Water Resources*, Chapter 3 (Rainwater Harvesting section)

Explanation

The passage directly states: *"Rainwater, or palar pani, as commonly referred to in these parts, is considered the purest form of natural water."* The tankas store this rainwater — they are not groundwater sources, so option B is wrong. Option D (Indira Gandhi Canal) is actually mentioned as the reason the practice is *declining*, not as a definition of palar pani. Examiners expect you to quote or closely paraphrase the textbook definition.

Q9. medium exam-ready **[1]**

Match the following traditional water harvesting structures with their regions and choose the correct option:
Column I (Structure) — Column II (Region)
a. Khadins — i. Bengal flood plains
b. Inundation channels — ii. Meghalaya
c. Bamboo drip irrigation — iii. Jaisalmer
d. Rooftop tankas — iv. Bikaner, Phalodi, Barmer

(A) a-iii, b-i, c-ii, d-iv
(B) a-i, b-iii, c-iv, d-ii
(C) a-ii, b-iv, c-i, d-iii
(D) a-iii, b-iv, c-ii, d-i

A a-iii, b-i, c-ii, d-iv
B a-i, b-iii, c-iv, d-ii
C a-ii, b-iv, c-i, d-iii
D a-iii, b-iv, c-ii, d-i

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Model Answer

The correct answer is **(A) a-iii, b-i, c-ii, d-iv**.

- Khadins → Jaisalmer (iii); Inundation channels → Bengal flood plains (i); Bamboo drip irrigation → Meghalaya (ii); Rooftop tankas → Bikaner, Phalodi, Barmer (iv).

Explanation

All four matches are directly stated in the chapter: khadins are mentioned for Jaisalmer; inundation channels for Bengal flood plains; bamboo drip irrigation for Meghalaya; and underground tankas (rooftop rainwater harvesting) for Bikaner, Phalodi and Barmer. Students must remember these region-structure pairs as they are frequently tested in MCQs and short-answer questions.

Q10. medium exam-ready **[1]**

Which of the following is NOT a consequence of building large dams on rivers?
(A) Poor sediment flow and excessive sedimentation at reservoir bottom
(B) Increase in natural fertilisation of flood plains due to silt deposit
(C) Fragmentation of rivers making migration of aquatic fauna difficult
(D) Submergence of existing vegetation and soil in the reservoir

A Poor sediment flow and excessive sedimentation at reservoir bottom
B Increase in natural fertilisation of flood plains due to silt deposit
C Fragmentation of rivers making migration of aquatic fauna difficult
D Submergence of existing vegetation and soil in the reservoir

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Model Answer

(B) Increase in natural fertilisation of flood plains due to silt deposit

Building dams actually **deprives** flood plains of silt (a natural fertiliser), leading to land degradation — the opposite of increased fertilisation.

Source: Water Resources, Chapter 3 (Multi-purpose River Projects and Integrated Water Resources Management)

Explanation

The passage clearly states that "sedimentation also meant that the flood plains were deprived of silt, a natural fertiliser." Options A, C, and D are all directly listed as consequences of large dams in the source text. Option B describes a benefit that dams actually **destroy**, making it the "NOT a consequence" answer. Watch for trick questions where the opposite of a stated effect is given as an option.

Q11. medium exam-ready **[1]**

[mcq] The Krishna–Godavari dispute between Maharashtra and downstream states arose primarily because:
(A) Andhra Pradesh built an unauthorised dam on the Krishna river without consulting other states
(B) Maharashtra's diversion of water at Koyna for a multipurpose project reduced the downstream flow into the Krishna
(C) Karnataka refused to release water from the Almatti Dam during drought years
(D) Telangana unilaterally withdrew from a pre-existing water-sharing agreement on the Godavari

A Andhra Pradesh diverted water from the Krishna river for industrial use
B Maharashtra diverted more water at Koyna for a multipurpose project, reducing downstream flow
C Karnataka built an unauthorised dam on the Godavari river
D Telangana refused to share water from the Nagarjunakonda reservoir

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Model Answer

Answer: (B)

The Krishna–Godavari dispute arose because Maharashtra diverted more water at Koyna for a multipurpose project, reducing downstream flow, causing objections from Karnataka and Andhra Pradesh.

Source: Multi-purpose River Projects and Integrated Water Resources Management, Chapter 3

Explanation

The textbook explicitly states: *"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."* Options C and D mention incorrect states and structures; Option A wrongly blames Andhra Pradesh. Always quote/paraphrase the textbook box directly for such factual MCQs.

Q12. straightforward exam-ready **[1]**

By approximately what year is it predicted that nearly two billion people will live in absolute water scarcity?
(A) 2050
(B) 2030
(C) 2025
(D) 2040

A 2050
B 2030
C 2025
D 2040

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Model Answer

(C) 2025

It is predicted that by **2025**, nearly two billion people will live in absolute water scarcity.

Source: Water Resources, Chapter 3 (Introduction)

Explanation

The answer is directly stated in the Introduction of Chapter 3: *"Why is it predicted that by 2025, nearly two billion people will live in absolute water scarcity?"* For MCQs like this, quote or closely reference the textbook line. Do not confuse with other commonly cited years like 2050.

Q13. straightforward exam-ready **[1]**

The bamboo drip irrigation system that is about 200 years old is practised in which state?
(A) Himachal Pradesh
(B) Sikkim
(C) Meghalaya
(D) Manipur

A Himachal Pradesh
B Sikkim
C Meghalaya
D Manipur

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Model Answer

(C) Meghalaya

Explanation

The passage clearly states: "In Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes, is prevalent." This is a direct factual question — simply recall the state name. Meghalaya is the correct answer; do not confuse it with Manipur or Sikkim.

Source: Water Resources, Chapter 3

Q14. medium exam-ready **[1]**

Assertion (A): In many cities, housing societies rely on their own groundwater pumping devices to meet water needs.
Reason (R): Large and dense urban populations have increased water and energy requirements, leading to over-exploitation of groundwater.

(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

A Both A and R are true, and R is the correct explanation of A.
B Both A and R are true, but R is not the correct explanation of A.
C A is true but R is false.
D A is false but R is true.

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Model Answer

(A) Both A and R are true, and R is the correct explanation of A.

The textbook states that multiplying urban centres with large and dense populations have added to water and energy requirements, leading housing societies to install their own groundwater pumping devices — directly explaining A.

Explanation

The passage explicitly links both statements: urban population growth → increased water/energy demand → over-exploitation of groundwater → housing societies relying on private pumping devices. Since R directly causes A, option (A) is correct. Students must check whether R logically and directly explains A, not just whether both are true.

Q15. medium exam-ready **[1]**

Assertion (A): The Damodar river was historically known as the 'river of sorrow' in the Damodar valley region.
Reason (R): The river frequently caused destructive floods that devastated life, property and agricultural activities in the region.

(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

A Both A and R are true, and R is the correct explanation of A.
B Both A and R are true, but R is not the correct explanation of A.
C A is true but R is false.
D A is false but R is true.

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Model Answer

(A) Both A and R are true, and R is the correct explanation of A.

The Bhadu song from the Damodar valley confirms the river was called 'river of sorrow' because its frequent floods devastated life, property and agricultural activities in the region.

Explanation

The source passage contains a Bhadu folk song from the Damodar valley that directly states the Damodar was "known as the river of sorrow" due to flooding troubles faced by people. Since the floods are precisely the reason it earned this title, R correctly explains A — making option (A) the right choice.

Q16. medium exam-ready **[1]**

Assertion (A): Even a region that receives high annual rainfall can suffer from water scarcity.
Reason (R): Water scarcity can arise from poor water quality due to pollution by domestic wastes, industrial effluents, pesticides and fertilisers.

(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

A Both A and R are true, and R is the correct explanation of A.
B Both A and R are true, but R is not the correct explanation of A.
C A is true but R is false.
D A is false but R is true.

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Model Answer

(B) Both A and R are true, but R is not the correct explanation of A.

Assertion (A) is true — a high-rainfall region can still face water scarcity due to large population, over-exploitation, or unequal access. Reason (R) is also true — pollution makes water hazardous and unusable. However, R describes only one specific cause of scarcity and does not fully explain why *high-rainfall* regions particularly suffer, making R not the correct explanation of A.

Source: Water Resources, Chapter 3 — *Water Scarcity and the Need for Water Conservation and Management*

Explanation

- **Assertion (A)** is supported by the text: cities with ample water still face scarcity due to overexploitation, large population, and unequal access — not just low rainfall.
- **Reason (R)** is also true: the textbook explicitly states water can be polluted by "domestic and industrial wastes, chemicals, pesticides and fertilisers."
- However, R explains only the *quality-based* scarcity scenario, **not** the general reason why high-rainfall areas face scarcity (which is mainly over-exploitation and population pressure). So R is true but **not the correct explanation** of A → Answer is **(B)**.

Q17. medium exam-ready **[1]**

Assertion (A): The practice of rooftop rainwater harvesting has declined in western Rajasthan in recent years.
Reason (R): The availability of water through the perennial Indira Gandhi Canal has reduced dependence on traditional water storage methods in that region.

(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

A Both A and R are true, and R is the correct explanation of A.
B Both A and R are true, but R is not the correct explanation of A.
C A is true but R is false.
D A is false but R is true.

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Model Answer

(A) Both A and R are true, and R is the correct explanation of A.

The textbook states: "Today, in western Rajasthan, the practice of rooftop rainwater harvesting is on the decline as plenty of water is available due to the perennial Indira Gandhi Canal." Thus both statements are true and R correctly explains A.

Explanation

The exact textbook line directly links the decline in rooftop rainwater harvesting (Assertion) to the availability of water through the Indira Gandhi Canal (Reason), making R the correct explanation of A. Students should remember this specific example as it is frequently tested. Option (A) is the only correct choice.

Q18. straightforward exam-ready **[2]**

[very_short_answer] Explain why water is considered a renewable resource despite being constantly consumed by human activities.

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Model Answer

Water is considered a renewable resource because it is continuously renewed and recharged through the **hydrological cycle**. Freshwater obtained from surface run-off and groundwater is constantly replenished as all water moves within this cycle — through evaporation, condensation, and precipitation — ensuring its availability is restored over time.

Source: Chapter 3, Introduction

Explanation

- The key phrase examiners look for is **"hydrological cycle"** — always name it.
- Mention that freshwater (surface run-off + groundwater) is **continually renewed/recharged** — this directly addresses "despite being consumed."
- Do not confuse renewable with unlimited; scarcity still exists. You don't need to elaborate on scarcity here unless asked.
- 2 marks = 1 mark for the concept of renewal + 1 mark for naming/explaining the hydrological cycle mechanism.

Q19. medium exam-ready **[2]**

Why is water scarcity in India not always a result of low rainfall? Give two reasons.

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Model Answer

Water scarcity in India is not always due to low rainfall because:

1. **Over-exploitation and unequal access:** Areas with high rainfall may still face scarcity due to over-exploitation of water resources, excessive use, and unequal access among different social groups.
1. **Water pollution:** Even where water is sufficiently available, it may be polluted by domestic/industrial wastes, chemicals, pesticides and fertilisers, making it hazardous and unusable for human needs.

Source: Water Resources, Chapter 3 — Water Scarcity and the Need for Water Conservation and Management

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Explanation

- The examiner expects **two distinct reasons** clearly stated — award 1 mark each.
- Avoid simply writing "low rainfall" as the cause; the question asks *why it is NOT always due to low rainfall*, so your reasons must point to other factors.
- Key terms to include: *over-exploitation*, *unequal access*, *water pollution* — these come directly from the textbook and signal to the examiner you have read the chapter carefully.
- Do not confuse quantity-based scarcity with quality-based scarcity; both are valid and separate reasons here.

Q20. straightforward exam-ready **[2]**

[very_short_answer] Distinguish between 'khadins' and 'johads' as traditional water harvesting structures. In which type of landscape are they typically used?

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Model Answer

Khadins are agricultural fields converted into rain-fed storage structures where water is allowed to stand and moisten the soil. They are found in **Jaisalmer**.

Johads are similar rain-fed storage structures used in **other parts of Rajasthan**.

Both are used in **arid and semi-arid regions** of Rajasthan.

Source: Water Resources, Chapter 3

Explanation

The passage does not give elaborate separate definitions for khadins and johads — both are described together as "agricultural fields converted into rain-fed storage structures that allowed the water to stand and moisten the soil." The only distinction the textbook makes is **location**: khadins → Jaisalmer; johads → other parts of Rajasthan. Do not invent additional differences. Examiners award marks for correctly naming both structures, their shared function, and their landscape (arid/semi-arid). Keep it brief — this is a 2-mark answer.

Q21. medium exam-ready **[2]**

State two ways in which multi-purpose river projects have ironically worsened the very problems they were built to solve.

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Model Answer

Two ways multi-purpose projects ironically worsened the problems they were built to solve:

1. **Floods:** Dams built to *control* floods have actually *triggered* floods due to excessive sedimentation in the reservoir, and have mostly failed to control floods during heavy rainfall.
1. **Soil degradation:** Projects meant to support agriculture led to sedimentation of floodplains, depriving them of natural silt (a fertiliser), and caused salinisation of soil due to water-intensive cropping patterns — worsening land degradation.

Source: Chapter 3 — Multi-Purpose River Projects and Integrated Water Resources Management

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Explanation

The examiner expects you to pick **two distinct ironic/contradictory outcomes** directly from the text. The most scoreable pair is:

- Dams built to **control floods** ended up **causing floods** (via sedimentation in the reservoir).
- Projects built to **help agriculture** worsened **land degradation** (loss of silt on floodplains; salinisation).

Avoid vague answers like "they cause displacement" — that is a disadvantage, not an ironic worsening of the *same* problem. The keyword "ironically" signals the examiner wants a **contradiction** between intent and outcome.

Q22. medium exam-ready **[2]**

How does irrigation through multi-purpose projects lead to the problem of salinisation of soil? Name the cropping change that contributes to this.

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Model Answer

When irrigation water is oversupplied through canals from multi-purpose projects, it raises the water table. As this water moves upward through capillary action, it brings dissolved salts to the surface, leading to **salinisation** of the soil, which makes it infertile.

The cropping change responsible is the shift to **water-intensive and commercial crops** by farmers in irrigated regions.

Source: Water Resources, Multi-Purpose River Projects and Integrated Water Resources Management

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Explanation

- Two points are needed for 2 marks: (1) the mechanism of salinisation, and (2) the name of the cropping change.
- The textbook states directly: *"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."*
- Mention capillary action / rising water table → salt deposition — this shows understanding of the process.
- Do **not** write about waterlogging as a separate issue; keep focus on salinisation as asked.

Q23. medium exam-ready **[3]**

Explain three causes of water scarcity in India that are unrelated to low annual rainfall.

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Model Answer

Three causes of water scarcity unrelated to low annual rainfall are:

1. **Over-exploitation and growing population:** A large and growing population demands more water for domestic use and food production, leading to over-exploitation of surface water and groundwater resources.
1. **Industrialisation and urbanisation:** The ever-increasing number of industries are heavy users of water. Dense urban populations with high water needs further deplete freshwater resources, including groundwater through private pumping devices.
1. **Water pollution:** Even where water is sufficiently available, it may be rendered unusable due to pollution by domestic and industrial wastes, chemicals, pesticides and fertilisers, effectively creating scarcity.

Source: Water Resources, Chapter 3 — "Water Scarcity and the Need for Water Conservation and Management"

Explanation

Examiners expect three **distinct** causes, each clearly stated and briefly explained — not just listed as single words. The key instruction here is "unrelated to low annual rainfall," so avoid mentioning drought or low precipitation. The passage explicitly names: over-exploitation, large population, unequal access, industrialisation, urbanisation, and water pollution as causes — pick any three and explain each in 1–2 lines. One mark per cause.

Q24. medium exam-ready **[3]**

[short_answer] Explain how the traditional 'tanka' system of rooftop rainwater harvesting works in the arid regions of Rajasthan. Why was it considered an effective solution to drinking water scarcity in that region?

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Model Answer

In the arid regions of Rajasthan (Bikaner, Phalodi, Barmer), almost every house had an underground tank called a **tanka** built inside the main house or courtyard. The sloping rooftops were connected to the tanka through a pipe. Rainwater falling on the roof travelled down the pipe and was stored underground. The first spell of rain was not collected, as it cleaned the roofs and pipes; only subsequent showers were stored.

It was an effective solution because:

- Rainwater (*palar pani*) is considered the purest form of natural water.
- Water could be stored till the next rainfall, providing a reliable drinking water source when all other sources dried up in summer.
- The underground location kept the water cool and prevented evaporation.

Source: Water Resources, Chapter 3

Explanation

- The question is worth **3 marks**, so examiners expect: (1) how the system works mechanically, (2) at least two reasons for its effectiveness.
- Key terms to use: *tanka*, *palar pani*, underground storage, sloping rooftop, pipe connection, first-spell discarding.
- Do **not** confuse tanka with khadins or johads — those are for agriculture, not drinking water.
- Mentioning the first spell of rain being discarded shows precise textbook knowledge and often fetches the extra mark.

Q25. medium exam-ready **[3]**

[short_answer] Using any three examples from different parts of ancient India, explain how traditional societies managed water resources effectively long before modern engineering.

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Model Answer

Ancient Indians managed water resources through ingenious local methods:

1. **Sringaverapura (1st century B.C.)** near Allahabad had a sophisticated water harvesting system that channelled floodwater of the Ganga for storage and use.
1. **Khadins and Johads in Rajasthan** — agricultural fields were converted into rain-fed storage structures; in arid Rajasthan, underground *tankas* stored rooftop rainwater for drinking.
1. **Guls/Kuls of the Western Himalayas** — diversion channels were built in hilly regions to redirect stream water for irrigation of agricultural fields.

These examples show that ancient societies understood local rainfall, soil conditions, and geography, designing effective water systems without modern engineering.

Source: Water Resources, Chapter 3

Explanation

- The examiner expects **three distinct examples from different regions** — that is the core demand. Pick examples from geographically separate areas (plains, arid zone, hills).
- Name the place/system clearly, then give **one specific detail** (what it did / how it worked).
- A brief concluding line showing the "so what" (local ecological knowledge) helps but keep it to one sentence.
- Avoid listing more than three; depth over breadth for 3 marks.

Q26. deep exam-ready **[3]**

Explain how the construction of dams affects the aquatic ecosystem and the natural fertility of surrounding agricultural land.

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Model Answer

Construction of dams affects the aquatic ecosystem and agricultural land in the following ways:

1. **Aquatic ecosystem**: Regulating and damming rivers causes poor sediment flow and excessive sedimentation at the reservoir bottom, resulting in rockier stream beds and poorer habitats for aquatic life. Dams fragment rivers, making it difficult for aquatic fauna to migrate, especially for spawning.
1. **Agricultural fertility**: Flood plains are deprived of silt — a natural fertiliser — as sedimentation occurs within the reservoir instead of being deposited downstream. This leads to land degradation and loss of natural soil fertility in surrounding agricultural areas.

Source: Multi-purpose River Projects and Integrated Water Resources Management, Chapter 3

Explanation

The examiner expects **two clear impacts** — one on the aquatic ecosystem and one on agricultural land fertility — each explained with specific details from the textbook. Key terms to include: *sediment flow, sedimentation, spawning, silt, natural fertiliser, land degradation*. Avoid generic statements; use textbook language. Since it is 3 marks, 3 distinct points (or 2 well-explained points) work well. Do not write about displacement or other unrelated dam impacts.

Q27. medium exam-ready **[3]**

[short_answer] How can rooftop rainwater harvesting transform water availability in rain-fed rural areas? Support your answer with a suitable example from India.

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Model Answer

Rooftop rainwater harvesting collects rainwater from sloping rooftops through pipes into underground storage tanks (tankas), making it available during dry summers when other sources fail. It is a low-cost, decentralised solution that reduces dependence on erratic rainfall and distant water sources.

Example — Gendathur village, Mysuru, Karnataka: Nearly 200 households installed rooftop rainwater harvesting systems. With an annual precipitation of 1,000 mm and 80% collection efficiency, each house collects about 50,000 litres annually, and collectively the village harvests 1,00,000 litres per year, earning the distinction of being "rich in rainwater."

Source: *Water Resources*, Chapter 3, Rainwater Harvesting section

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Explanation

- The question is 3 marks, so aim for ~60–80 words with a clearly named Indian example.
- Examiners expect: (1) how the system works, (2) its benefit for water availability, and (3) a **specific named example with data** (Gendathur figures are given in the textbook and impress examiners).
- Rajasthan's *tanka* system is equally valid as an example; Gendathur is preferred here as it directly shows rural transformation.
- Do not confuse Gendathur (Karnataka) with Shillong (Meghalaya) — both are in the chapter but serve different points.

Q28. deep exam-ready **[3]**

Why does Shillong, located only 55 km from the world's highest rainfall areas, still face acute water shortage? What does this tell us about managing water resources?

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Model Answer

Shillong faces acute water shortage despite being only 55 km from Cherrapunji and Mawsynram (world's highest rainfall areas) because rainfall does not automatically ensure water availability. The rainwater quickly flows away as runoff and is not adequately stored or conserved for use.

This situation tells us that **water scarcity is not always about low rainfall** — it is also about poor water management and storage. Hence, Shillong residents have adopted rooftop rainwater harvesting, which meets 15–25% of household water needs. Effective conservation, storage, and management of water resources are essential even in high-rainfall regions.

Source: Water Resources, Chapter 3 (Rainwater Harvesting section)

Explanation

- The key fact from the textbook: Cherrapunji/Mawsynram are 55 km from Shillong, yet Shillong faces acute shortage → use this directly.
- The lesson: water scarcity ≠ only low rainfall; management and storage matter equally.
- Always mention the solution given (rooftop rainwater harvesting, 15–25% supply) — examiners expect it for full marks.
- 3-mark answer needs: **cause of shortage (1 mark) + broader lesson on management (1 mark) + example/solution (1 mark)**.

Q29. deep exam-ready **[5]**

Multi-purpose river projects were envisioned as engines of national development after Independence. Critically evaluate this claim by discussing both their intended benefits and the problems that emerged from their implementation.

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Model Answer

After Independence, multi-purpose river projects were seen as "temples of modern India" (Nehru's words), envisioned to drive development by integrating agriculture, industrialisation, and rural growth.

Intended Benefits:

- Irrigation for agricultural fields, expanding food production
- Hydroelectric power generation for industries and homes
- Flood control (e.g., Hirakud project on Mahanadi)
- Domestic and industrial water supply, inland navigation, and fish breeding
- Bringing water to drought-prone and water-scarce regions (e.g., Sardar Sarovar)

Problems that Emerged:

- Poor sediment flow; excessive sedimentation making riverbeds rockier, harming aquatic life
- Fragmentation of rivers, disrupting migration and spawning of aquatic fauna
- Submergence of vegetation causing decomposition; loss of fertile floodplain silt leading to land degradation
- Dams ironically triggered floods due to reservoir sedimentation
- Induced earthquakes, water-borne diseases, and water pollution
- Salinisation of soil due to shift to water-intensive crops
- Large-scale displacement and loss of livelihood of communities
- Inter-state water disputes (e.g., Krishna-Godavari dispute)

Thus, while multi-purpose projects brought significant development, their social and ecological costs cannot be ignored.

Source: Chapter 3 – Water Resources, Multi-purpose River Projects and Integrated Water Resources Management

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Explanation

- Examiners expect **both sides** clearly — benefits AND problems — with specific examples (Bhakra-Nangal, Hirakud, Sardar Sarovar, Krishna-Godavari dispute).
- Use Nehru's quote ("temples of modern India") — it scores well as it directly links to "critically evaluate the claim."
- Don't just list — briefly explain each point (e.g., *why* sedimentation is a problem).
- For 5 marks: ~5 benefits + ~5 problems with a concluding line is ideal. Avoid padding with unrelated content.

Q30. deep exam-ready **[5]**

Water scarcity is as much a human-made crisis as a natural one. Analyse this statement with reference to the role of population growth, industrialisation, urbanisation, and agricultural practices in depleting and degrading India's freshwater resources.

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Model Answer

Water scarcity in India is largely a human-made crisis, caused by the following factors:

1. **Population Growth:** A large and growing population demands more water for domestic use and food production. To meet this, irrigated agriculture — the largest consumer of water — is over-exploited, causing falling groundwater levels.
1. **Industrialisation:** The ever-increasing number of industries exerts heavy pressure on freshwater resources, both as direct users and through demand for hydroelectric power.
1. **Urbanisation:** Multiplying urban centres with dense populations and high-consumption lifestyles aggravate water demand. Housing colonies pump groundwater indiscriminately, causing depletion in cities.
1. **Agricultural Practices:** Over-exploitation through tube-wells and wells lowers groundwater. Irrigation-led shift to water-intensive crops causes salinisation of soil and further degradation.
1. **Pollution:** Industrial and domestic wastes, pesticides and chemical fertilisers pollute available freshwater, creating scarcity even where water is physically abundant.

Thus, scarcity is caused more by mismanagement and over-exploitation than by natural shortage alone.

Source: Water Resources, Chapter 3 — Water Scarcity and the Need for Water Conservation and Management

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Explanation

- Examiners expect **five distinct human causes** for a 5-mark question — one point per mark is a reliable structure.
- Quote key phrases from the textbook: "over-exploitation, excessive use, unequal access," "irrigated agriculture is the largest consumer," "multiplying urban centres," "falling groundwater levels."
- Don't just list — briefly explain the *impact* of each factor on freshwater (depletion or degradation).
- The concluding line reinforces the statement in the question, which examiners reward.
- Avoid writing about natural causes (rainfall variation, drought) at length — the question asks you to analyse the **human-made** dimension.

Q31. medium exam-ready **[5]**

[long_answer] India has a rich tradition of community-based water harvesting. Describe any five traditional or modern rainwater harvesting methods practised in different regions of India, explaining the region, the method, and why it is ecologically or socially significant.

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Model Answer

India has a rich tradition of water harvesting suited to local conditions:

1. **Guls/Kuls (Western Himalayas):** Diversion channels built in hilly regions to channel stream water for agriculture. They are ecologically suited to mountain terrain and ensure irrigation without large infrastructure.
1. **Rooftop Rainwater Harvesting with Tankas (Rajasthan):** Underground tanks (tankas) store rooftop rainwater, called *palar pani*. They provide reliable drinking water in arid regions during dry summers when other sources fail.
1. **Khadins and Johads (Rajasthan):** Agricultural fields converted into storage structures to retain rainwater, moistening soil for cultivation. They recharge groundwater and support farming in semi-arid areas.
1. **Inundation Channels (Bengal):** Channels dug in flood plains to divert and use floodwater for irrigating fields — an ecologically low-cost, community-managed method.
1. **Bamboo Drip Irrigation (Meghalaya):** A 200-year-old system using bamboo pipes to transport spring water by gravity, delivering 20–80 drops per minute to plant roots — water-efficient and locally sustainable.

Source: Water Resources, Chapter 3

Explanation

- The question asks for **five methods** with region, method, and significance — so structure each point with all three elements.
- All five examples come directly from the chapter; don't invent methods.
- Examiners award marks for correctly naming the method, its region, and its ecological/social value — one incomplete point loses marks.
- "Palar pani" and "khadins/johads" are key terms examiners look for.
- Keep each point to 2–3 lines — don't over-explain any single method at the cost of omitting others.

Q32. medium exam-ready **[4]**

Read the following passage and answer the questions that follow:

In semi-arid and arid Rajasthan, almost every household traditionally maintained an underground storage tank connected to the sloping roof through a pipe. The first rain of the season was deliberately left uncollected to clean the roof and pipe. Subsequent rainwater was stored in these tanks, which could be as large as a big room. In one household in Phalodi, the tank measured 6.1 metres deep, 4.27 metres long and 2.44 metres wide. This stored rainwater, called 'palar pani', was considered the purest natural water and could last until the next monsoon. However, today the practice is declining in western Rajasthan because of the availability of the Indira Gandhi Canal. Yet, in Gendathur village of Karnataka, nearly 200 households have adopted rooftop rainwater harvesting, collectively harvesting around 1,00,000 litres annually.

(i) Why was the first spell of rain not collected in the traditional Rajasthan system? (1 mark)
(ii) What does the term 'palar pani' mean and why was it valued? (1 mark)
(iii) Calculate approximately how much water a single household in Gendathur harvests annually, given that the village total from 200 households is 1,00,000 litres. (1 mark)
(iv) What does the contrast between declining harvesting in Rajasthan and its adoption in Karnataka tell us about the relationship between water availability and conservation behaviour? (1 mark)

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Model Answer

(i) The first spell of rain was not collected because it was used to **clean the rooftops and the pipes** connected to the underground tank (tanka), ensuring that only clean water was stored subsequently.

(ii) 'Palar pani' means **rainwater** in the local language. It was valued because it was considered the **purest form of natural water** and could be stored until the next monsoon, serving as a reliable drinking water source when all other sources dried up.

(iii) Total water harvested ÷ Number of households = 1,00,000 ÷ 200 = **500 litres per household annually.** *(Note: As per the passage, each household actually harvests ~50,000 litres; the 1,00,000 litre figure likely refers to a specific shared/collective tank.)*

(iv) The contrast shows that **when water is easily available (via canals), people tend to abandon conservation practices**. Conversely, where water remains scarce or access is limited (Karnataka village), communities actively adopt harvesting. This highlights that **necessity drives conservation behaviour**.

Source: Chapter 3 — Water Resources, NCERT Class 10 Geography

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Explanation

- **(i)** The passage explicitly states the first rain cleaned the roof and pipe — mention both parts for full marks.
- **(ii)** Give both the meaning AND the reason for its value; the passage calls it "purest form of natural water."
- **(iii)** The straightforward division gives 500 L. The passage elsewhere mentions 50,000 L per household — the question uses the 1,00,000 L figure from its own passage, so answer accordingly and note the discrepancy honestly if you notice it.
- **(iv)** This is an inference question — use the contrast directly: availability → complacency; scarcity → conservation. Keep it crisp for 1 mark.

Q33. deep exam-ready **[4]**

Read the following and answer the questions:

After Independence, India invested heavily in multi-purpose river projects. The Bhakra–Nangal project in the Sutluj–Beas basin was used for both hydel power and irrigation. The Hirakud project on the Mahanadi was meant to integrate water conservation with flood control. The Sardar Sarovar on the Narmada was designed to serve four states — Maharashtra, Madhya Pradesh, Gujarat and Rajasthan — providing irrigation to millions of hectares and ensuring water supply to drought-prone and desert areas. However, critics point out that large reservoirs submerge vegetation, disrupt fish migration, cause sedimentation, and have even triggered earthquakes and water-borne diseases. The Damodar, once nicknamed the 'river of sorrow', saw its valley project built to tame its floods — yet the dams have at times triggered floods through excessive sedimentation in the reservoir.

(i) Name two purposes served by the Bhakra–Nangal project. (1 mark)
(ii) How does sedimentation in a reservoir ironically cause the very problem the dam was built to prevent? (1 mark)
(iii) Why are large dams said to fragment rivers, and what impact does this have on aquatic life? (1 mark)
(iv) Despite its benefits, why has the Sardar Sarovar project faced opposition? Suggest one valid concern. (1 mark)

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Model Answer

(i) The Bhakra–Nangal project serves two purposes: **hydel (hydroelectric) power production** and **irrigation**.

(ii) Excessive sedimentation accumulates at the bottom of the reservoir, reducing its water-holding capacity. This causes water to overflow the dam during heavy rainfall, triggering floods — the very problem the dam was meant to prevent.

(iii) Large dams fragment rivers by blocking the continuous flow of water, creating barriers. This disrupts the migration of aquatic fauna, especially for **spawning** (breeding), threatening fish populations and disturbing the river's aquatic ecosystem.

(iv) The Sardar Sarovar project faces opposition because large reservoirs submerge existing vegetation and soil, leading to decomposition. One valid concern is **displacement of local and tribal communities** whose lands are submerged, causing loss of livelihood and habitat.

Source: Chapter 3 — Multi-purpose River Projects and Integrated Water Resources Management

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Explanation

- **(i)** Direct answer from the textbook; name both purposes clearly.
- **(ii)** The key word is "ironically" — examiners want you to show the cause-effect chain: sedimentation → reduced capacity → overflow → floods.
- **(iii)** Use the term "spawning" as it appears in the source; it shows precise textbook knowledge.
- **(iv)** The passage mentions submergence of vegetation; displacement is a widely accepted concern from the chapter context. State one concern clearly — don't list many vaguely.

Q34. deep exam-ready **[4]**

Study the following information and answer the questions:

Meghalaya, in northeast India, is home to two remarkable water management traditions. First, the bamboo drip irrigation system — about 200 years old — taps stream and spring water using bamboo pipes. Around 18–20 litres of water enters the bamboo pipe system and, after travelling over hundreds of metres, is reduced to just 20–80 drops per minute at the plant site. Second, rooftop rainwater harvesting is widely practised in Shillong, even though Cherapunjee and Mawsynram — situated just 55 km away — receive the highest rainfall in the world. Nearly every Shillong household has a rooftop harvesting structure, which contributes 15–25% of total household water needs. Meanwhile, water scarcity is a reality even in areas of high rainfall, primarily due to absence of proper storage and distribution systems.

(i) What physical principle makes the bamboo drip irrigation system work without any mechanical pumping? (1 mark)
(ii) Why does Shillong face water scarcity despite being located so close to the world's highest rainfall areas? (1 mark)
(iii) What does the reduction of 18–20 litres at entry to 20–80 drops per minute at the plant site tell us about the bamboo drip irrigation system's approach to water use? (1 mark)
(iv) How does the example of Meghalaya challenge the assumption that water scarcity is only a problem of arid or low-rainfall regions? (1 mark)

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Model Answer

(i) The bamboo drip irrigation system works on the principle of **gravity**. Water from hilltop springs and streams flows naturally downhill through bamboo pipes without any mechanical pumping.

(ii) Shillong faces water scarcity due to the **absence of proper storage and distribution systems**, not lack of rainfall. High rainfall nearby does not help if water cannot be stored and supplied effectively.

(iii) The drastic reduction from 18–20 litres to just 20–80 drops per minute shows that the system is designed for **highly efficient, targeted water use** — delivering water directly to plant roots with minimal wastage.

(iv) Meghalaya shows that water scarcity is not limited to arid regions — even areas near the world's highest rainfall zones face acute shortage due to **poor storage and distribution**, proving scarcity is a management problem, not just a rainfall problem.

Source: Water Resources, Chapter 3

Explanation

- **(i)** The passage caption explicitly says water is diverted "by gravity" — that is the one-word principle examiners expect.
- **(ii)** Quote directly from the passage: "absence of proper storage and distribution systems."
- **(iii)** This is an inference question — link the numbers to the idea of precision/efficiency in water delivery.
- **(iv)** Connects the case study to the broader concept from the chapter: scarcity is caused by mismanagement, not just low rainfall. This analytical point is what examiners reward.

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