Which SDG is most directly linked to sustainable groundwater management, given its role in ensuring water security and ecosystem health?

- SDG 6
- SDG 13
- SDG 7
- SDG 15

Yes, the answer is correct.

Score: 1

Accepted Answers:

SDG 6

1 point

The “sustainable yield" of an aquifer is best defined as:

- The maximum pumping rate achievable with modern technology
- The total volume of water stored in the aquifer
- The annual rainfall over the aquifer’s recharge zone
- The rate of extraction that equals long-term recharge minus discharge to ecosystems

Yes, the answer is correct.

Score: 1

Accepted Answers:

The rate of extraction that equals long-term recharge minus discharge to ecosystems

1 point

In a drought-prone region, groundwater is the primary water source. Over-pumping has caused wells to dry up. What is the most sustainable long-term solution?

Drill deeper wells to access fossil groundwater

Implement managed aquifer recharge (MAR) and rainwater harvesting

Import water from neighbouring regions

Reduce agricultural activity permanently

Yes, the answer is correct.

Score: 1

Accepted Answers:

Implement managed aquifer recharge (MAR) and rainwater harvesting

1 point

Which of the following is not a reliable indicator of groundwater sustainability?

Groundwater recharge rate

Water table decline rate

Total dissolved solids (TDS)

Number of wells in a region

Yes, the answer is correct.

Score: 1

Accepted Answers:

Number of wells in a region

1 point

Which of the following is NOT a sustainability indicator?

Saltwater intrusion in coastal aquifers

Land subsidence

Groundwater depletion

Rainfall recharge

Yes, the answer is correct.

Score: 1

Accepted Answers:

Rainfall recharge

1 point

How does climate change most likely affect groundwater systems?

Uniform increase in global recharge rates

More variable recharge due to erratic rainfall

Complete depletion of all shallow aquifers

Decreased reliance on groundwater

Yes, the answer is correct.

Score: 1

Accepted Answers:

More variable recharge due to erratic rainfall

1 point

A mining project lowers the water table, causing nearby wetlands to dry. Which sustainability principle is violated?

Intergenerational equity

Polluter pays principle

Precautionary principle

Subsidiarity principle

Yes, the answer is correct.

Score: 1

Accepted Answers:

Intergenerational equity

1 point

Why is groundwater often undervalued in economic assessments?

It is invisible and perceived as free

Extraction costs are negligible

It has no role in industrial processes

Governments subsidize all groundwater use

Yes, the answer is correct.

Score: 1

Accepted Answers:

It is invisible and perceived as free

1 point

To address the over-extraction, a government implements tradable permits for groundwater which aligns with.. ?

Command-and-control regulation

Market-based environmental policy

Integrated Water Resources Management (IWRM)

The precautionary principle

Yes, the answer is correct.

Score: 1

Accepted Answers:

Market-based environmental policy

1 point

If a groundwater recharge study is planned for the full Water Year 2025–26, the data collection period should be:

January 1, 2025 to December 31, 2025

June 1, 2025 to May 31, 2026

April 1, 2025 to March 31, 2026

July 1, 2025 to June 30, 2026

No, the answer is incorrect.

Score: 0

Accepted Answers:

June 1, 2025 to May 31, 2026

1 point

If a farmer switches from flood irrigation to drip irrigation, what is the primary benefit?

Increased recharge

Reduced extraction

Improved water quality

Enhanced well lifespan

Yes, the answer is correct.

Score: 1

Accepted Answers:

Reduced extraction

1 point

Two countries share an aquifer. Country A pollutes it, affecting Country B. Which international principle applies?

- Absolute territorial sovereignty
- Prior appropriation doctrine
- No-harm rule
- Riparian rights

Yes, the answer is correct.

Score: 1

Accepted Answers:

No-harm rule

1 point

A city's rapid expansion has replaced permeable land with construction and paving. How does this affect groundwater?

- Recharge increases due to efficient storm water drainage
- Recharge decreases due to reduced infiltration
- The water table rises because of reduced evapotranspiration
- Aquifer salinity decreases as runoff flushes contaminants

Yes, the answer is correct.

Score: 1

Accepted Answers:

Recharge decreases due to reduced infiltration

1 point

To improve groundwater resilience in a drought-prone urban area, the best strategy is:

- Constructing large dams to store surface water

Managed aquifer recharge using treated wastewater

Banning groundwater use for agriculture

Drilling deeper community wells

Yes, the answer is correct.

Score: 1

Accepted Answers:

Managed aquifer recharge using treated wastewater

1 point

Pumping from an aquifer has dried up a wetland. What key sustainability principle was ignored?

Safe yield

Peak water theory

Hydrologic connectivity

Environmental flow allocation

Yes, the answer is correct.

Score: 1

Accepted Answers:

Environmental flow allocation

1 point

Which policy most effectively reduces groundwater overuse in India?

Subsidized Power Tariffs

PMKSY (Per Drop More Crop)

Groundwater extraction bans

National Aquifer Mapping

Yes, the answer is correct.

Score: 1

Accepted Answers:

PMKSY (Per Drop More Crop)

A landfill leaks heavy metals into an aquifer. Which factor mostly controls the spread of contamination?

- Aquifer porosity
- Groundwater flow velocity
- Depth to water table
- Cone of depression

Yes, the answer is correct.

Score: 1

Accepted Answers:

Groundwater flow velocity

1 point

A river's baseflow (dry-season flow) has declined sharply over a decade. What is the likely cause that affects groundwater?

- Increased groundwater recharge from rainfall
- Excessive pumping of nearby wells intercepting aquifer discharge
- Expansion of riparian vegetation
- Reduced evaporation due to climate change

Yes, the answer is correct.

Score: 1

Accepted Answers:

Excessive pumping of nearby wells intercepting aquifer discharge

1 point

Which of the following correctly describes the vertical order of water zones from the land surface downward in a typical unsaturated profile?

Capillary fringe → Soil water zone → Vadose zone

Soil water zone → Capillary fringe → Zone of saturation

Zone of saturation → Capillary fringe → Soil water zone

Soil water zone → Saturated zone → Capillary fringe

No, the answer is incorrect.

Score: 0

Accepted Answers:

Soil water zone → Capillary fringe → Zone of saturation

1 point

A basin has an annual precipitation (P) of 1200 mm , evapotranspiration (ET) of 700 mm , and surface runoff (R) of 300 mm. Assuming no net change in storage, what is the annual groundwater recharge (G)?

200 mm

500 mm

1000 mm

1200 mm

Yes, the answer is correct.

Score: 1

Accepted Answers:

200 mm

1 point

Which of the following correctly explains why groundwater flow is typically much slower than surface water flow?

- Groundwater has a lower temperature than surface water
- Aquifers have higher permeability than rivers
- The effective flow path in groundwater is tortuous and restricted
- The recharge rate of groundwater is zero

Yes, the answer is correct.

Score: 1

Accepted Answers:

The effective flow path in groundwater is tortuous and restricted

1 point

Which of the following best differentiates between an aquifer and an aquitard?

- Aquifers are impermeable, while aquitards are permeable
- Aquitards can store water but transmit it very slowly
- Aquifers are always unconfined while aquitards are confined
- Aquitards cannot store any groundwater

Yes, the answer is correct.

Score: 1

Accepted Answers:

Aquitards can store water but transmit it very slowly

1 point

A community depends on an unconfined aquifer for irrigation. Over the last decade, withdrawals have increased by 40%, but water levels have dropped only slightly. Which property of the aquifer is likely buffering this decline?

Low transmissivity

High specific retention

High storativity

Low hydraulic gradient

Yes, the answer is correct.

Score: 1

Accepted Answers:

High storativity

1 point

In a certain region, an unconfined aquifer has been recharged with rainfall at a rate of 200 mm/year. The specific yield of the aquifer is 0.2. What is the potential increase in water table (in meters) per year due to this recharge (assuming no discharge)?

0.1 m

0.4 m

1.0 m

0.2 m

Yes, the answer is correct.

Score: 1

Accepted Answers:

1.0 m

1 point

If recharge mentioned in Question 8 continues for 5 years, but 30% of the recharge is lost to evapotranspiration, what is the net rise in the water table?

2.5 m

3.5 m

4.0 m

5.0 m

Yes, the answer is correct.

Score: 1

Accepted Answers:

3.5 m

1 point

What term describes the saturated zone above a low-permeability lens that is above the regional water table?

Confined aquifer

Perched water table

Artesian aquifer

Vadose zone

Yes, the answer is correct.

Score: 1

Accepted Answers:

Perched water table

1 point

Which of the following groundwater provinces in India is characterized by extensive alluvial aquifers with high recharge potential and is considered the country's most productive agricultural belt?

Deccan Trap Basalt Province

Indo-Gangetic-Brahmaputra Alluvial Province

Peninsular Granitic Province

Himalayan Foothill Province

Yes, the answer is correct.

Score: 1

Accepted Answers:

Indo-Gangetic-Brahmaputra Alluvial Province

1 point

In a loamy soil profile, the average pore radius is estimated to be 0.005 cm. If the observed capillary rise is 29.4 cm, and water has a density of 1 g/cm³, with g = 980 cm/s² and contact angle = 0°, estimate the surface tension (γ).

24.5 dyne/cm

49 dyne/cm

72 dyne/cm

98 dyne/cm

Yes, the answer is correct.

Score: 1

Accepted Answers:

72 dyne/cm

1 point

A the sandy aquifer has a porosity of 35% and an average linear velocity of 1.2 m/day. If effective porosity is 25%, what is the Darcy velocity

0.3 m/day

0.42 m/day

1.2 m/day

0.6 m/day

Yes, the answer is correct.

Score: 1

Accepted Answers:

0.3 m/day

1 point

A groundwater well penetrates a confined aquifer with a transmissivity of 800

m^2/day and a hydraulic gradient of 0.001. What is the flow rate per unit width of aquifer (in m^2/day)?

0.8

8

0.001

800

Yes, the answer is correct.

Score: 1

Accepted Answers:

0.8

1 point

Over a 5-year monitoring period, groundwater levels in a confined aquifer remained stable, with no measurable rise or fall in piezometric heads. However, water balance data for the same period indicated an average annual lateral inflow of 25 million

m

3

, groundwater abstraction of 40 million

m

3

, and natural discharge to nearby streams of 15 million

m

3

. Despite this apparent imbalance between total inflow and outflow, the storage change was effectively zero. Which of the following provides the most plausible explanation for this observation, assuming all field measurements are accurate?

- The aquifer is over drafted, and storage decline has not yet been detected
- There is artificial recharge occurring through stormwater injection
- There is vertical leakage into the aquifer from an overlying formation
- The abstraction and discharge data are likely overestimated

Yes, the answer is correct.

Score: 1

Accepted Answers:

There is vertical leakage into the aquifer from an overlying formation

1 point

Two confined aquifers of equal thickness and porosity respond differently to pumping. Aquifer A is composed of dense basalt, while Aquifer B is made of fractured sandstone. Under similar conditions, Aquifer A shows a quicker change in pressure. What is the most likely explanation?

- Aquifer A has higher specific storage due to higher pore volume
- Aquifer A has lower specific storage because basalt is less compressible

Aquifer A has higher specific storage due to lower permeability Aquifer A has lower specific storage due to higher porosity

No, the answer is incorrect.

Score: 0

Accepted Answers:

Aquifer A has lower specific storage because basalt is less compressible

Managed Aquifer Recharge (MAR) is best described as:

The natural process of rainwater percolation into the aquifer

The intentional recharge of water into aquifers under controlled conditions

A method of storing water only in surface reservoirs

Artificial pumping of groundwater for irrigation

Yes, the answer is correct.

Score: 1

Accepted Answers:

The intentional recharge of water into aquifers under controlled conditions

1 point

Which statement best captures groundwater sustainability across physical, ecological, and institutional perspectives?

Pump ≤ annual recharge at the district scale

Maintain aquifer storage, ecosystem functions, and service reliability over time under acceptable risk and governance constraints

Avoid depletion and quality deterioration without allowing storage decline

Keep pumping constant if wells do not run dry in summer

Yes, the answer is correct.

Score: 1

Accepted Answers:

Maintain aquifer storage, ecosystem functions, and service reliability over time under acceptable risk and governance constraints

1 point

Safe yield most commonly refers to:

- Maximum pumpage equal to average natural recharge
- Pumpage that prevents any water level decline
- Pumpage that avoids long term undesirable results
- Pumpage that equals minimum dry year recharge

No, the answer is incorrect.

Score: 0

Accepted Answers:

Maximum pumpage equal to average natural recharge

1 point

Floodplain wetland restoration primarily enhances groundwater recharge through which process?

- Infiltration through macropores
- Infiltration over a broad area with longer residence time
- Percolation via deep fractures
- Reduced lateral subsurface flow

Yes, the answer is correct.

Score: 1

Accepted Answers:

Infiltration over a broad area with longer residence time

1 point

Which urban design measure is most suitable for improving recharge while maintaining acceptable stormwater quality?

Extended impermeable road margins

Conventional kerb-and-drain system

Permeable pavement connected to subsurface infiltration facility

Concrete block paving over compacted sub-base

Yes, the answer is correct.

Score: 1

Accepted Answers:

Permeable pavement connected to subsurface infiltration facility

1 point

Which combination most reduces physical clogging in infiltration basins?

High rate loading + no drying cycles

Fine suspended solids with continuous wetting

Pretreatment (sedimentation/filtration), staged loading, periodic drying & scraping

Chlorination alone

Yes, the answer is correct.

Score: 1

Accepted Answers:

Pretreatment (sedimentation/filtration), staged loading, periodic drying & scraping

1 point

When evaluating a site for an Aquifer Storage and Recovery (ASR) project, which of the following hydrogeological conditions would most likely constitute a significant risk to successful operation?

Confined aquifer with moderate transmissivity and storativity values

Ambient piezometric head lower than the proposed injection head, with moderate sodium hazard in ambient water

Prominent vertical salinity stratification in the aquifer, creating a high potential for saline upconing during injection and recovery

Availability of surplus treated surface water during the non-irrigation season

No, the answer is incorrect.

Score: 0

Accepted Answers:

Prominent vertical salinity stratification in the aquifer, creating a high potential for saline upconing during injection and recovery

1 point

Match the following traditional water systems with their region and primary purpose

System	Region / Purpose
1. Neher aqueduct	A. Rajasthan & Gujarat; stepped masonry wells for storage
2. Stepwells	B. Aurangabad; urban water conveyance (~1612 CE)
3. Johads	C. Himachal Pradesh; gravity channels from springs/glaciers
4. Kuls	D. Rajasthan & Haryana; earthen embankments for rainwater

1-B, 2-A, 3-D, 4-C

1-A, 2-B, 3-C, 4-D

1-B, 2-D, 3-A, 4-C

1-C, 2-A, 3-B, 4-D

Yes, the answer is correct.

Score: 1

Accepted Answers:

1-B, 2-A, 3-D, 4-C

1 point

If an aquifer shows a stage of extraction of 85% and steady decline in water levels over a decade, which conclusion is most appropriate?

The aquifer is under sustainable management

Extraction is high and likely unsustainable

The stage of extraction value alone is sufficient to assess sustainability

Pumping may be increased without consequence

Yes, the answer is correct.

Score: 1

Accepted Answers:

Extraction is high and likely unsustainable

1 point

A primary reason for restoring wetlands in the context of groundwater recharge is:

Increasing evaporation

Promoting infiltration and storage of surface water in the subsurface

Diverting river flows away from agriculture

Reducing groundwater levels to prevent waterlogging

Yes, the answer is correct.

Score: 1

Accepted Answers:

Promoting infiltration and storage of surface water in the subsurface

1 point

Which practice is most directly linked to improving infiltration in agricultural fields?

Frequent deep tillage

Maintaining surface residue cover and minimal soil disturbance

Shortening the irrigation interval

Planting only deep-rooted crops

Yes, the answer is correct.

Score: 1

Accepted Answers:

Maintaining surface residue cover and minimal soil disturbance

1 point

Which of the following *is not* a recognised benefit of MAR?

Enhancement of water availability during dry periods

Improvement of groundwater quality in some settings

Reduction of flood peaks in certain catchments

Permanent elimination of evaporation losses from surface storage

Yes, the answer is correct.

Score: 1

Accepted Answers:

Permanent elimination of evaporation losses from surface storage

1 point

Which technique is most suitable for locating a production well a shallow, unconfined aquifer in a coarse alluvial setting adjacent to a perennial river?

- Riverbank filtration well
- Deep well with large casing into confined sandstone
- Large-diameter skimming well in coarse alluvium near the riverbank
- Vertical tubewell screened in overbank sand–silt away from the main channel

Yes, the answer is correct.

Score: 1

Accepted Answers:

Riverbank filtration well

1 point

Which policy option can contribute to both enhancing recharge and ensuring long-term regulation of groundwater use?

- Protecting identified recharge zones through land-use controls, with abstraction charges based on volume used
- Mandating minimum well depths for all new irrigation wells in water-stressed areas
- Limiting withdrawals in designated urban and peri-urban zones
- Providing time-of-day electricity tariffs for agricultural pumping

Yes, the answer is correct.

Score: 1

Accepted Answers:

Protecting identified recharge zones through land-use controls, with abstraction charges based on volume used

1 point

Match the MAR techniques to the suitable hydrogeological settings

Technique	Hydrogeological setting
1. River bank filtration (RBF)	A. Confined/saline margin; pressure build
2. Percolation pond	B. Coastal/alluvial valley; unconfined
3. Subsurface dyke/barrier	C. Alluvial river; thick sand–gravel
4. Aquifer Storage & Recovery (ASR)	D. Hard rock; shallow water table

1-A, 2-B, 3-C, 4-D

1-D, 2-C, 3-A, 4-B

1-C, 2-D, 3-B, 4-A

1-B, 2-A, 3-D, 4-C

Yes, the answer is correct.

Score: 1

Accepted Answers:

1-C, 2-D, 3-B, 4-A

1 point

Which of the following is **not** generally considered a suitable criterion for selecting a site for a percolation pond?

Presence of permeable soils and weathered/fractured zone of adequate thickness

Location in a natural depression to maximise storage

Proximity to a perennial river with thick sand–gravel aquifer

Availability of sufficient catchment runoff during the monsoon

Yes, the answer is correct.

Score: 1

Accepted Answers:

Proximity to a perennial river with thick sand–gravel aquifer

1 point

Which factor has the most direct influence on the bicarbonate concentration in groundwater from a shallow, unconfined aquifer in a limestone terrain?

Temperature of recharge water

Rate of evapotranspiration

Partial pressure of CO_2 in the unsaturated zone

Saturation index of gypsum

Yes, the answer is correct.

Score: 1

Accepted Answers:

Partial pressure of CO_2 *in the unsaturated zone*

1 point

A water sample has Ca^{2+} = 40 mg/L, Mg

2+

= 24 mg/L. Calculate total hardness (as

CaCO

3

). (Atomic weights: Ca = 40, Mg = 24.3;

CaCO

3

equivalent weight = 50)

150 mg/L

180 mg/L

200 mg/L

220 mg/L

No, the answer is incorrect.

Score: 0

Accepted Answers:

180 mg/L

1 point

Match processes with their typical effect on groundwater:

1. Cation exchange (Na–Ca)	A. Increase in Ca^{2+} and SO_4^{2-}
2. Gypsum dissolution	B. Increase in Na^+ and decrease in Ca^{2+}
3. Calcite precipitation	C. Increase in all ion concentrations
4. Evapotranspiration in arid zones	D. Decrease in HCO_3^- and Ca^{2+}

1B, 2A, 3D, 4C

1A, 2B, 3C, 4D

1C, 2D, 3A, 4B

1D, 2C, 3B, 4A

Yes, the answer is correct.

Score: 1

Accepted Answers:

1B, 2A, 3D, 4C

1 point

Two wells tapping the same aquifer 5 km apart have high Na^+ concentration in one well have same Cl^- in both. Which is the most probable explanation?

Point-source industrial contamination

Ion exchange with clays

Seawater intrusion

Anthropogenic nitrate input

Yes, the answer is correct.

Score: 1

Accepted Answers:

Ion exchange with clays

1 point

What hydrochemical change is most likely during prolonged pumping from a fractured rock aquifer with low storage?

TDS decreases due to dilution

pH increase due to CO_2 emission

Rapid increase in dissolved oxygen

Decrease in silica concentration

No, the answer is incorrect.

Score: 0

Accepted Answers:

pH increase due to CO_2 emission

1 point

A Schoeller plot shows all major ion concentrations decreasing with time in an observation well after a heavy monsoon. What is the most likely explanation?

Cation exchange

Dilution from recharge

Upconing of saline water

Evapotranspiration increases

Yes, the answer is correct.

Score: 1

Accepted Answers:

Dilution from recharge

1 point

Match the Following – Sampling Precautions

1. DO measurement	A. On-site titration (phenolphthalein + methyl orange) or lab analysis within 24h
2. Alkalinity	B. Analyse on-site without delay
3. Metal analysis	C. Store in glass or high-density polyethylene, no chemical preservatives
4. Isotope sampling	D. Filtered, acidified sample in a polyethylene bottle

1B, 2A, 3D, 4C

1A, 2C, 3D, 4B

1A, 2A, 3B, 4D

1D, 2B, 3A, 4C

Yes, the answer is correct.

Score: 1

Accepted Answers:

1B, 2A, 3D, 4C

1 point

Which aquifer condition is most prone to salinization from evaporative concentration?

Confined aquifer in humid climate

Shallow water table in arid climate

Karstic aquifer with rapid recharge

Volcanic aquifer with high permeability

Yes, the answer is correct.

Score: 1

Accepted Answers:

Shallow water table in arid climate

1 point

A monitoring program shows increasing

SO_4^{2-} and Ca^{2+} but stable Cl^- in groundwater over several years. What is the most plausible cause?

Gypsum dissolution

Seawater intrusion

Industrial effluent rich in chlorides

Ion exchange

Yes, the answer is correct.

Score: 1

Accepted Answers:

Gypsum dissolution

1 point

Along a flow path in a sandstone aquifer, pH increases from 6.5 to 8.2, and

HCO_3^-

rises while

Ca^{2+}

decreases. The dominant geochemical process is:

- Calcite precipitation
- Pyrite oxidation
- Cation exchange
- CO_2 emission

Yes, the answer is correct.

Score: 1

Accepted Answers:

Cation exchange

1 point

As groundwater moves slowly from a forested hill toward a lake, which of these changes is least likely to occur?

- The water becomes clearer as suspended particles settle out over time.
- The water tastes saltier after dissolving minerals like sodium chloride from rocks.
- The water turns more acidic due to decaying leaves.

The water loses oxygen because microbes consume it underground.

Yes, the answer is correct.

Score: 1

Accepted Answers:

The water turns more acidic due to decaying leaves.

1 point

A rural community notices gradual changes in its groundwater quality over five years. The water supply comes from a well located 1.2 km downgradient from an area with mixed land use. Which land use change in the most probable recharge zone would most likely explain new detectable petroleum hydrocarbons (0.1-0.3 mg/L) in the well water?

Expansion of organic vineyards 800 m east of the well

Decommissioning of a machinery maintenance yard 50 m northwest of the well

Construction of a new solar farm 1 km southwest of the well

Conversion of grassland to a parking lot 400 m north of the well

No, the answer is incorrect.

Score: 0

Accepted Answers:

Decommissioning of a machinery maintenance yard 50 m northwest of the well

1 point

In a granitic terrain, groundwater has high silica (SiO_2), and sodium (Na)

+

), but low calcium (

Ca

2+

) concentrations with a neutral pH. These characteristics primarily result from:

- dissolution of quartz veins,
- weathering of plagioclase feldspar,
- contamination from overlying limestone,
- mixing with deep saline fluids

Yes, the answer is correct.

Score: 1

Accepted Answers:

weathering of plagioclase feldspar,

1 point

Groundwater monitoring in tropical laterite shows consistently low aluminium (<0.1 mg/L) over 15 years. Which mineral's extreme weathering resistance best explains this observation?

- Gibbsite
- Kaolinite
- Quartz
- Calcite

Yes, the answer is correct.

Score: 1

Accepted Answers:

Gibbsite

1 point

A hydrogeologist collects three groundwater samples from different zones of an aquifer system. Lab results show:

Sample	EC (µS/cm)	TDS (mg/L)	Dominant Ions
GW-1	1,850	1,184	Ca^{2+}, HCO_3^-
GW-2	2,800	1,792	Na^+, Cl^-
GW-3	3,200	2,240	Na^+, SO_4^{2-}

Which statement best explains the variation in the empirical conversion factor (k) derived from these samples?

k increases with higher EC due to ion pairing effects

k values differ based on dominant ion chemistry

k decreases proportionally with TDS concentration

k variation results from measurement errors in EC probes

Yes, the answer is correct.

Score: 1

Accepted Answers:

k values differ based on dominant ion chemistry

Which organization provides the primary international reference standards for

$\delta^{18}O$

and

$\delta^{2}H$

used in groundwater studies?

WHO

IAEA

NIST

USGS

Yes, the answer is correct.

Score: 1

Accepted Answers:

IAEA

1 point

An alluvial aquifer in a semi-arid region is under evaluation for long-term groundwater sustainability.

$\delta^{18}O$

and

$\delta^{2}H$

values from the wells are similar to those of present-day rainfall. Radiocarbon dating (

^{14}C

) shows groundwater residence times of less than 100 years. What is the most reasonable conclusion?

The aquifer is sustained by fossil recharge, and extraction is unsustainable.

The aquifer is recharged mainly by glacial meltwater with very slow replenishment.

Groundwater is derived entirely from evaporated surface ponds, so sustainability is uncertain.

Recharge is occurring from modern rainfall, possibly supporting sustainable use if abstraction is balanced.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Recharge is occurring from modern rainfall, possibly supporting sustainable use if abstraction is balanced.

1 point

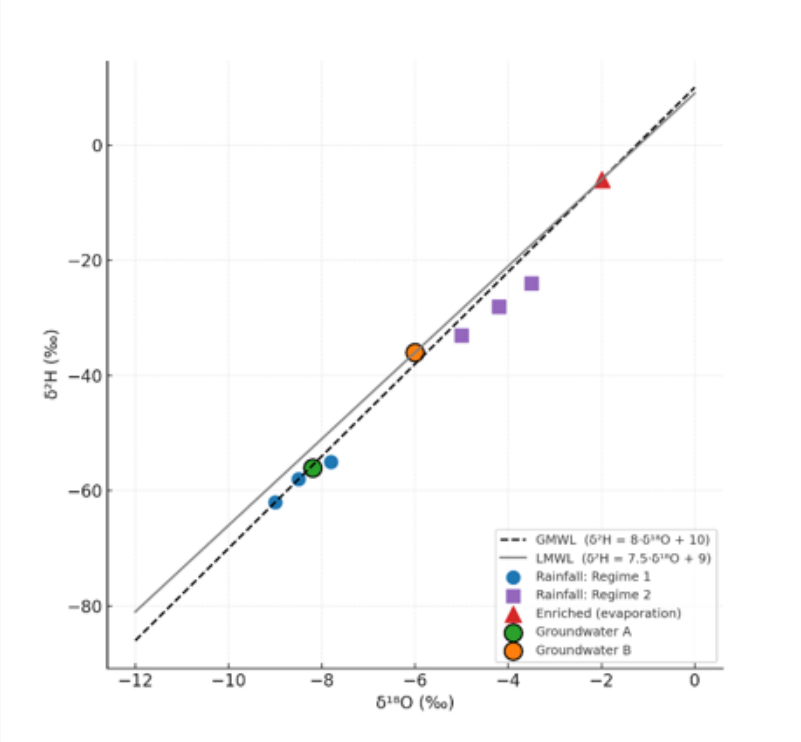
Refer to the

$\delta^{2}H$

vs

$\delta^{18}O$

plot and answer. Which is the most reasonable inference for groundwater sustainability?



Both are fossil water, which can be abstracted without restriction

A shows meteoric recharge; B includes evaporation, needs cautious use

Both depend only on Regime 2 rainfall, safe for more pumping

A is isolated from rainfall; B is entirely evaporated

Yes, the answer is correct.

Score: 1

Accepted Answers:

A shows meteoric recharge; B includes evaporation, needs cautious use

1 point

Determine the deuterium excess for Groundwater B (Refer to the graph in Q3)

-12 ‰

+20‰

+12‰

0‰

No, the answer is incorrect.

Score: 0

Accepted Answers:

+12‰

1 point

Tritium concentration in groundwater is commonly expressed in which of the following units?

ppm

%

‰

TU

Yes, the answer is correct.

Score: 1

Accepted Answers:

TU

1 point

A deep aquifer in an arid region has groundwater with modern tritium levels but depleted carbon-14 activity. Rainfall is rare. What is the most likely explanation for aquifer recharge dynamics?

Aquifer is recharged frequently by recent rainfall.

Recharge is rapid in shallow zones and near-stagnant at depth; surface infiltration traces do not reach the deepest layers.

Human activities increased tritium in the zone, while ancient water stays untouched below.

The aquifer is uniformly contaminated with surface water

Yes, the answer is correct.

Score: 1

Accepted Answers:

Recharge is rapid in shallow zones and near-stagnant at depth; surface infiltration traces do not reach the deepest layers.

1 point

Suppose a time-series graph shows abrupt spikes of uranium concentration in groundwater after irrigation periods, followed by gradual declines. Which management practice is MOST effective for sustainable remediation?

Increase groundwater abstraction

Alternate wetting-drying cycles in irrigation to reduce leaching

Construct deeper wells

Stop irrigation completely

Yes, the answer is correct.

Score: 1

Accepted Answers:

Alternate wetting-drying cycles in irrigation to reduce leaching

1 point

Which situation CANNOT be resolved by isotope hydrology?

Determining groundwater recharge rates from precipitation

Identifying mixing between groundwater units

Determination of pore size of aquifer material

Tracing pollution sources using isotopic fingerprints

Yes, the answer is correct.

Score: 1

Accepted Answers:

Determination of pore size of aquifer material

1 point

A karst aquifer supplies water to a city. Isotope analysis identifies rapid recharge and mixing after each rainfall event, but groundwater shows rising nitrate and fluoride levels. What sustainable management action is most urgent?

Stop rainfall infiltration completely

Implement targeted water treatment and robust land use monitoring near recharge areas

Expand urbanization in recharge zones

Deepen drinking wells to avoid nitrate/fluoride

Yes, the answer is correct.

Score: 1

Accepted Answers:

Implement targeted water treatment and robust land use monitoring near recharge areas

1 point

Groundwater in a rural area contains high calcium and magnesium ions. What concern does this raise?

Toxicity

Hardness

Acidity

Alkalinity

Yes, the answer is correct.

Score: 1

Accepted Answers:

Hardness

1 point

Which solution is MOST sustainable for preventing agricultural nitrate contamination in groundwater?

Increasing irrigation rates

Buffer zones and controlled fertilizer application

Switching to groundwater-only drinking water

Regular pipe descaling

Yes, the answer is correct.

Score: 1

Accepted Answers:

Buffer zones and controlled fertilizer application

1 point

Match the isotopes in Column A with their most appropriate application in Column B:

1. $^{87}Sr/^{86}Sr$ & $^{11}B/^{10}B$	A. Distinguish agricultural, sewage, and natural nitrate sources
2. ^{34}S & ^{18}O (in sulphates)	B. Identify mixing between aquifers
3. $\delta^{15}N$ & $\delta^{18}O$ (in NO_3^-)	C. Trace industrial contamination
4. $^{206}Pb/^{207}Pb$	D. Detect landfill leachate or salinity pathways
5. ^{37}Cl	E. Trace water–rock interaction in sulphate systems

1–B, 2–E, 3–A, 4–C, 5–D

1–E, 2–A, 3–B, 4–D, 5–C

1–C, 2–D, 3–E, 4–B, 5–A

1–A, 2–B, 3–C, 4–E, 5–D

No, the answer is incorrect.

Score: 0

Accepted Answers:

1–B, 2–E, 3–A, 4–C, 5–D

1 point

Sandy soils with high permeability from a shallow unconfined aquifer underlying an agricultural plain. The water table depth is ~5 m, and the area experiences intensive fertilizer use. Which statement best reflects its vulnerability to nitrate contamination?

The aquifer is highly vulnerable because contaminants can quickly percolate through permeable soils and the shallow unsaturated zone.

The aquifer is highly vulnerable because high porosity ensures rapid flushing of contaminants.

The aquifer is not vulnerable to contamination from sustainable use of agrochemicals.

The aquifer is vulnerable because fertilizers are surface-bound and cannot reach the groundwater.

Yes, the answer is correct.

Score: 1

Accepted Answers:

The aquifer is highly vulnerable because contaminants can quickly percolate through permeable soils and the shallow unsaturated zone.

1 point

A site has the following DRASTIC parameter ratings Using the standard weights, calculate the DRASTIC index.

Depth to water (D)	8
Net recharge (R)	6
Aquifer media (A)	7
Soil media (S)	4
Topography (T)	2
Impact of vadose zone (I)	9
Hydraulic conductivity (C)	6

140

158

212

250

Yes, the answer is correct.

Score: 1

Accepted Answers:

158

1 point

Based on the index calculated in the above (Q. 14). What does this value indicate?

Very low vulnerability to contamination

Moderate vulnerability to contamination

High vulnerability to contamination

Not interpretable without site-specific tracer tests

No, the answer is incorrect.

Score: 0

Accepted Answers:

High vulnerability to contamination

1 point

A hard-rock aquifer in a granitic terrain shows elevated ^{222}Rn (radon) in groundwater. Which factor most strongly controls its health risk significance?

Radon's chemical reactivity with aquifer minerals

Radon's half-life (3.8 days) and residence time in water before release

Radon's contribution to electrical conductivity of water

Radon's correlation with nitrate levels

Yes, the answer is correct.

Score: 1

Accepted Answers:

Radon’s half-life (3.8 days) and residence time in water before release

1 point

In groundwater health risk assessment, which statement is correct?

NOAEL is the lowest concentration at which effects are seen

LOAEL is always higher than NOAEL

NOAEL is the highest tested dose without observed adverse effects, while LOAEL is the lowest tested dose with observed adverse effects

LOAEL and NOAEL are interchangeable in risk assessment

Yes, the answer is correct.

Score: 1

Accepted Answers:

NOAEL is the highest tested dose without observed adverse effects, while LOAEL is the lowest tested dose with observed adverse effects

Groundwater from a coastal alluvial aquifer system is a primary source for irrigation. Suppose the pre-monsoon water table at an observation well 2 km inland is 1.2 m above Mean Sea Level (MSL). What is the approximate depth to the freshwater-seawater interface at the coastline according to the Ghyben-Herzberg principle? (Assume standard density values)

12 m below MSL

24 m below MSL

48 m below MSL

36 m below MSL

Yes, the answer is correct.

Score: 1

Accepted Answers:

48 m below MSL

1 point

A region has rapidly declining groundwater levels due to the overuse of groundwater for irrigated agriculture. Which of the following scenarios would lead to well salinisation most quickly at a location 1 km from the coast?

A constant pumping rate of 20 m^3/hr from a deep well screened at the base of the aquifer.

A variable pumping rate (higher in the day, lower at night) from a shallow well screened near the water table.

The construction of a check dam 5 km upstream for artificial recharge.

A seasonal monsoon leading to a 3-meter rise in the water table over two months.

Yes, the answer is correct.

Score: 1

Accepted Answers:

A constant pumping rate of 20 m^3/hr from a deep well screened at the base of the aquifer.

1 point

A sustainability assessment in a coastal region reveals increasing salinity in wells despite reduced pumping. The most probable cause is:

Seasonal recharge

Upconing or lateral seawater movement

Reduced porosity

Higher transmissivity inland

Yes, the answer is correct.

Score: 1

Accepted Answers:

Upconing or lateral seawater movement

1 point

In designing a monitoring network for coastal aquifers, which parameter is least useful?

Groundwater salinity (Cl^- concentration)

Water table fluctuations

Tidal records

Aquifer mineralogy changes over centuries

Yes, the answer is correct.

Score: 1

Accepted Answers:

Aquifer mineralogy changes over centuries

1 point

Which principle is commonly used to estimate the depth of the freshwater–saltwater interface in unconfined coastal aquifers?

Darcy's law

Ghyben–Herzberg relation

Dupuit–Forchheimer assumption

Theis solution

Yes, the answer is correct.

Score: 1

Accepted Answers:

Ghyben–Herzberg relation

1 point

Upconing is most likely to occur when:

- Recharge exceeds discharge in inland aquifers
- Pumping wells are installed near groundwater divides
- Pumping from coastal aquifers lowers the freshwater head below equilibrium
- Aquifers are confined beneath thick clay layers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Pumping from coastal aquifers lowers the freshwater head below equilibrium

1 point

Hydrochemical analysis of a monitoring well in a confined aquifer north of Chennai shows a progressive increase in chloride ions over time. However, stable isotope analysis ($\delta^{18}O$, $\delta^{2}H$) shows the water signature is meteoric, not oceanic. What is the most likely source of this salinity?

- Large-scale, lateral seawater intrusion from the Bay of Bengal.
- Leakage from overlying salt pan operations or infiltration of industrial wastewater.
- Upconing of paleo-salinity from deeper geological formations.
- Recharge from a nearby estuary during high tide.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Upconing of paleo-salinity from deeper geological formations.

1 point

There is a plan for a Managed Aquifer Recharge (MAR) scheme using treated wastewater to create a freshwater barrier against seawater intrusion in a critical coastal area. For this hydraulic barrier to be most effective, the injection wells should be placed

- At the coastline, with injection rates designed to maintain a water table exactly at MSL.
- In a line parallel to the coast, several kilometers inland, to significantly raise the overall water table mound.
- In a line parallel to the coast, just inland of the estimated toe of intrusion, to directly push the interface seaward.
- Randomly distributed across the affected area to ensure uniform recharge.

Yes, the answer is correct.

Score: 1

Accepted Answers:

In a line parallel to the coast, just inland of the estimated toe of intrusion, to directly push the interface seaward.

1 point

Which technique directly reduces the inland movement of seawater by creating an artificial groundwater ridge?

- Subsurface drainage
- Freshwater injection barrier
- Pumping reduction only
- Artificial wetlands

Yes, the answer is correct.

Score: 1

Accepted Answers:

Freshwater injection barrier

1 point

A coastal town plans to manage its aquifer sustainably. Which of the following approaches aligns best with long-term resilience?

Depend solely on desalination plants

Continuous pumping with periodic well replacement

Managed aquifer recharge with monitoring of salinity changes

Sealing off the aquifer from seawater using impermeable barriers only

Yes, the answer is correct.

Score: 1

Accepted Answers:

Managed aquifer recharge with monitoring of salinity changes

1 point

Which factor increases the inland penetration of the saltwater wedge most significantly?

Increase in hydraulic conductivity

Reduction in pumping

Decline in groundwater head

Increase in aquifer porosity

No, the answer is incorrect.

Score: 0

Accepted Answers:

Decline in groundwater head

1 point

A well 100 m inland from the coast has a freshwater head of 3 m. The interface depth (z) is given by the Ghyben–Herzberg relation. If pumping lowers the head to 1 m, the interface is expected to be ____ below sea level.

40 m

80 m

120 m

160 m

Yes, the answer is correct.

Score: 1

Accepted Answers:

40 m

1 point

Physical barriers like subsurface dams are most effective when:

The aquifer is unconfined with high recharge

The aquifer is of limited thickness

The aquifer is laterally continuous with high transmissivity

The groundwater flow direction is unstable

No, the answer is incorrect.

Score: 0

Accepted Answers:

The aquifer is of limited thickness

1 point

Conjunctive use of groundwater and surface water helps coastal aquifers because:

It raises the density of freshwater

It reduces overdependence on groundwater

It increases tidal fluctuations

It reduces transmissivity

Yes, the answer is correct.

Score: 1

Accepted Answers:

It reduces overdependence on groundwater

1 point

In a coastal aquifer, intensive pumping has led to progressive inland migration of the seawater wedge. Which approach is most suitable for estimating this pumping-driven intrusion distance?

Theis solution

Dupuit approximation

Glover’s equation

Darcy’s law

Yes, the answer is correct.

Score: 1

Accepted Answers:

Glover’s equation

1 point

Two identical wells pump from the same coastal aquifer. Well A is 50 m from the coastline; Well B is 300 m from the coastline. Which statement is MOST accurate regarding the risk of upconing?

Both wells have equal risk since they are in the same aquifer

Well B is more prone because the drawdown cones are deeper inland

Upconing is independent of well position relative to the wedge

Well A is more prone because the saline interface is closer beneath it

Yes, the answer is correct.

Score: 1

Accepted Answers:

Well A is more prone because the saline interface is closer beneath it

1 point

A monitoring network detects increasing salinity in shallow wells but stable salinity in deep wells. What is the most likely explanation?

Interface has risen due to upconing

Lateral intrusion affects shallow aquifer zones first

Density-driven convection stabilises deep layers

Measurement error in shallow wells

Yes, the answer is correct.

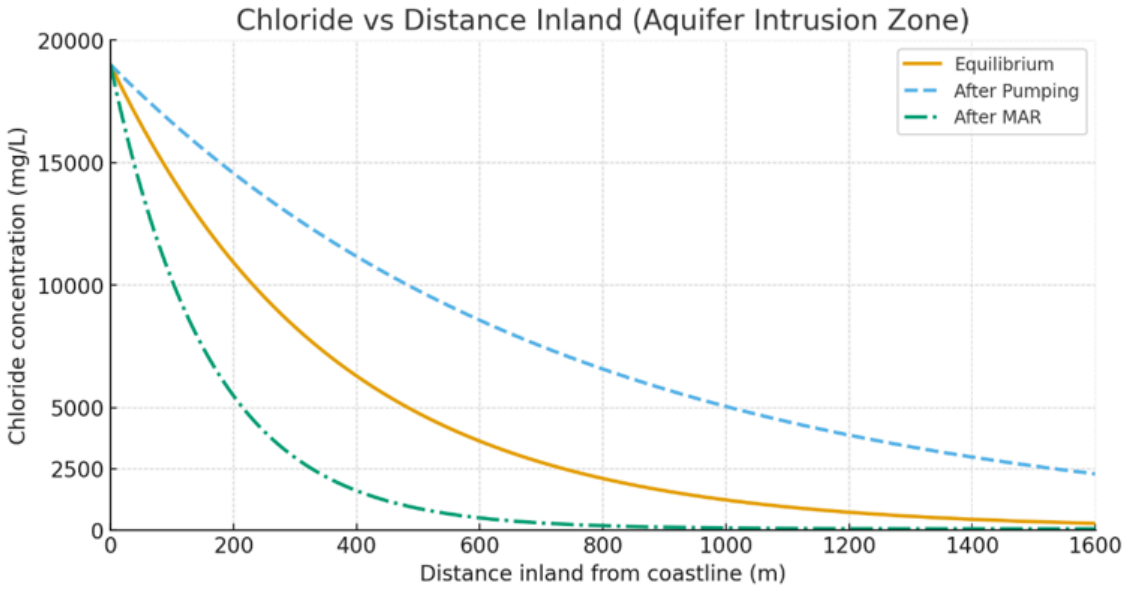
Score: 1

Accepted Answers:

Lateral intrusion affects shallow aquifer zones first

1 point

Observe the graph given below and answer the following (18-20). Which of the following best captures the comparative wedge behavior?



Pumping sustains elevated chloride levels farther inland; managed recharge sharply reduces chloride near the coast; the equilibrium falls between.

Pumping and recharge similarly decrease chloride; the equilibrium is stable.

Recharge elevates chloride near the coast; pumping lowers it inland.

Chloride profiles converge beyond 1000 meters inland.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Pumping sustains elevated chloride levels farther inland; managed recharge sharply reduces chloride near the coast; the equilibrium falls between.

1 point

The MAR curve decays much more steeply inland compared to the equilibrium. Which hydrodynamic process is best reflected in this shape?

Increase in vertical leakage through aquitards

Enhanced freshwater head pushing the interface seaward

Density reversal between fresh and saline water

Decline in aquifer storage coefficient

Yes, the answer is correct.

Score: 1

Accepted Answers:

Enhanced freshwater head pushing the interface seaward

1 point

At 400 m inland, chloride is ~10,000 mg/L under pumping but only ~2,000 mg/L under MAR. If a potable water threshold is 250 mg/L, what can be concluded?

Both conditions yield potable water at 400 m

Neither condition yields potable water at 400 m

Pumping yields potable water; MAR does not

MAR yields potable water; pumping does not

Yes, the answer is correct.

Score: 1

Accepted Answers:

Neither condition yields potable water at 400 m

An unconfined aquifer of an area of 2 km^2 and specific yield of 0.15 receives a uniform recharge of 120 mm/year. What is the net annual rise in the water table, assuming no losses?

0.60 m

0.80 m

1.00 m

1.20 m

Yes, the answer is correct.

Score: 1

Accepted Answers:

0.80 m

1 point

Groundwater models are primarily used for:

Predicting groundwater compression

Simulating groundwater flow and contaminant transport

Simulating three-phase flow

Designing dams

Yes, the answer is correct.

Score: 1

Accepted Answers:

Simulating groundwater flow and contaminant transport

1 point

A conceptualisation in groundwater modelling studies refers to:

A mathematical equation

A physical scale model of an aquifer

A simplified representation of hydrogeologic conditions

A 3D computer simulation

Yes, the answer is correct.

Score: 1

Accepted Answers:

A simplified representation of hydrogeologic conditions

1 point

What is the advantage of numerical groundwater models over analytical solutions?

- They can only solve homogeneous systems
- They handle complex boundary conditions and heterogeneity
- They require less data
- They always give exact answers

Yes, the answer is correct.

Score: 1

Accepted Answers:

They handle complex boundary conditions and heterogeneity

1 point

In groundwater modelling, boundary conditions define:

- The hydraulic properties of the aquifer
- How the model domain interacts with external influences
- The rainfall pattern over a region
- Only pumping well discharge rates

Yes, the answer is correct.

Score: 1

Accepted Answers:

How the model domain interacts with external influences

1 point

A no-flow boundary in a groundwater model represents:

- Row of injection wells
- A river system
- An impermeable boundary
- A row of pumping wells

Yes, the answer is correct.

Score: 1

Accepted Answers:

An impermeable boundary

1 point

A recharge project injects 5 m^3/day into an aquifer with a specific yield of 0.20 over an area of 5000 m^2. How many days are required to raise the water table by 0.5 m?

- 25 days
- 50 days
- 75 days
- 100 days

Yes, the answer is correct.

Score: 1

Accepted Answers:

100 days

1 point

Which of the following is a steady-state model?

Simulates flow under constant stress conditions

Includes variation of heads over time

Used only for head variation with distance

Represents variation in rainfall–runoff

Yes, the answer is correct.

Score: 1

Accepted Answers:

Simulates flow under constant stress conditions

1 point

A transient model is more appropriate when:

Hydraulic conductivity is unknown

Pumping stresses vary with time

The aquifer is homogeneous

No recharge occurs

Yes, the answer is correct.

Score: 1

Accepted Answers:

Pumping stresses vary with time

1 point

Model calibration involves:

Adjusting model parameters with is allowable range until simulated results match observed data

Changing boundary conditions to simulate the real field conditions

Adjusting model parameters to predict groundwater head

Replacing field measurements with assumed values to predict groundwater head

Yes, the answer is correct.

Score: 1

Accepted Answers:

Adjusting model parameters with is allowable range until simulated results match observed data

1 point

The hydraulic conductivity (K) in groundwater models controls:

The ability of the aquifer to store water

The thickness and the flow through aquifer layers

The rate of groundwater flow through porous media

The recharge rate from precipitation

Yes, the answer is correct.

Score: 1

Accepted Answers:

The rate of groundwater flow through porous media

1 point

A groundwater model is considered validated when:

It produces identical results to calibration

It can reproduce observations from independent datasets

It has more input parameters

It uses advanced software

Yes, the answer is correct.

Score: 1

Accepted Answers:

It can reproduce observations from independent datasets

1 point

Which of the following is a limitation of groundwater models?

They require calibration

They can incorporate heterogeneity

They are simplifications of reality

They can simulate scenarios

Yes, the answer is correct.

Score: 1

Accepted Answers:

They are simplifications of reality

1 point

A sensitivity analysis in groundwater modelling is used to:

Determine the most influential parameters on model outputs

Fix uncertain parameters permanently

Eliminate heterogeneity from the model

Replace calibration

Yes, the answer is correct.

Score: 1

Accepted Answers:

Determine the most influential parameters on model outputs

1 point

In contaminant transport modelling, advection refers to:

- Chemical reactions in groundwater
- Dispersion due to heterogeneity
- Movement of dissolved substances carried along by the overall flow of groundwater.
- Removal of solutes through pumping

Yes, the answer is correct.

Score: 1

Accepted Answers:

Movement of dissolved substances carried along by the overall flow of groundwater.

1 point

The purpose of scenario modelling in groundwater studies is to:

- Test aquifer response under different management or stress conditions
- Replace field monitoring
- Eliminate uncertainty in model inputs
- Accurately predict exact future groundwater levels

Yes, the answer is correct.

Score: 1

Accepted Answers:

Test aquifer response under different management or stress conditions

A city authority installs sensors in wells and storage tanks that continuously transmit data on groundwater levels, pumping rates, and water quality. The system is linked to mobile dashboards for real-time monitoring. This application is best described as:

Internet of Things (IoT) in water management

Traditional water auditing

Artificial recharge through percolation tanks

Manual well inventory by field staff

Yes, the answer is correct.

Score: 1

Accepted Answers:

Internet of Things (IoT) in water management

1 point

Which of the following is a major challenge for groundwater in rapidly urbanizing areas?

Over-irrigation with canal water

Contamination from leaking sewer lines and septic tanks

Salinity rise due to tidal wave

Recharge decline from glacier retreat

Yes, the answer is correct.

Score: 1

Accepted Answers:

Contamination from leaking sewer lines and septic tanks

1 point

A farmer’s group adopts water budgeting and shifts from water-intensive paddy to millets. This is an example of:

Managed aquifer recharge

Conjunctive use of surface and groundwater

Demand-side groundwater management

Enhanced aquifer transmissivity

Yes, the answer is correct.

Score: 1

Accepted Answers:

Demand-side groundwater management

1 point

During a city's groundwater audit, significant "non-revenue water" is recorded. A likely dual outcome is:

Loss of groundwater recharge and higher nitrate levels

Recharge of aquifers but with risk of contamination

Reduction in urban pumping requirements

Improved transmissivity of urban aquifers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Recharge of aquifers but with risk of contamination

1 point

The integrated water resources management (IWRM) approach is based on

Regulating groundwater separately from surface water

Coordinated use of water, land, and ecosystems across sectors

Exclusive focus on urban water supply

Preventing recharge to control urban flooding

Yes, the answer is correct.

Score: 1

Accepted Answers:

Coordinated use of water, land, and ecosystems across sectors

1 point

A community constructs check dams while also adopting drip irrigation. This represents:

- Only supply-side management
- Only demand-side management
- Integration of supply- and demand-side measures
- Governance of transboundary aquifers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Integration of supply- and demand-side measures

1 point

Which of the following regions in India is most often classified as a groundwater over-exploitation hotspot?

- Punjab and Haryana due to intensive paddy–wheat irrigation
- Kerala and Goa due to high monsoon recharge
- Assam and Meghalaya due to perennial river systems
- Odisha and Chhattisgarh due to coalfield aquifers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Punjab and Haryana due to intensive paddy–wheat irrigation

1 point

A water audit finds that 35% of extracted groundwater in a city is used for construction. The most sustainable policy measure is:

Ban all new construction

Mandate use of treated wastewater for construction

Allow unlimited bore well use in urban areas

Recharge aquifers with untreated sewage

Yes, the answer is correct.

Score: 1

Accepted Answers:

Mandate use of treated wastewater for construction

1 point

Which of the following **is** not a typical environmental impact of urban groundwater decline?

Land subsidence and infrastructure damage

Reduced base flow to lakes and rivers

Saline water intrusion in coastal aquifers

Enhanced groundwater recharge due to stormwater harvesting structures

Yes, the answer is correct.

Score: 1

Accepted Answers:

Enhanced groundwater recharge due to stormwater harvesting structures

1 point

A state government wants to simulate future water demand in a semi-arid river basin under different climate change and policy scenarios. The tool should allow integration of surface water, groundwater, and demand-side interventions at the basin scale. Which planning tool is most suitable?

MODFLOW

WEAP

Ghyben–Herzberg model

FEM

Yes, the answer is correct.

Score: 1

Accepted Answers:

WEAP

1 point

Smart water metering in urban areas is primarily introduced to

Increase the pumping efficiency of deep borewells

Recharge aquifers through controlled leakages

Monitor household and commercial water use in real time

Reduce transmissivity of urban aquifers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Monitor household and commercial water use in real time

1 point

Permeable pavements are promoted in urban areas mainly because they

Reduce evapotranspiration losses from streets

Increase transmissivity of underlying aquifers

Prevent saline water intrusion in coastal aquifers

Allow infiltration of stormwater, enhancing recharge and reducing runoff

Yes, the answer is correct.

Score: 1

Accepted Answers:

Allow infiltration of stormwater, enhancing recharge and reducing runoff

1 point

A metropolitan city introduces a program where treated wastewater is reused for construction, landscaping, and certain industries. Over time, this policy leads to reduced dependence on bore wells for non-potable needs. This approach best illustrates:

Water circularity principles in urban water management

Conventional groundwater recharge through percolation tanks

Increasing transmissivity of aquifers by pumping

Demand-side failure in water auditing

Yes, the answer is correct.

Score: 1

Accepted Answers:

Water circularity principles in urban water management

1 point

A semi-arid district shows falling groundwater levels, salinization of soils, and decline in vegetation cover. Over two decades, abandoned agricultural fields are replaced by barren land. This process is best described as:

Desertification driven by unsustainable land and water use

Natural variability in the hydrological cycle\

Glacial retreat due to climate change

Conjunctive use of surface and groundwater resources

Yes, the answer is correct.

Score: 1

Accepted Answers:

Desertification driven by unsustainable land and water use

1 point

Which of the following best ensures long-term groundwater sustainability?

Isolating hydrological science from governance

Restricting efforts only to artificial recharge structures

Avoiding stakeholder participation in decision-making

Linking scientific assessments with legal, institutional, and policy frameworks

Yes, the answer is correct.

Score: 1

Accepted Answers:

Linking scientific assessments with legal, institutional, and policy frameworks

1 point

The Regional Aquifer Model (RAM) is mainly useful for:

Simulating groundwater flow in a single pumping well

Basin-scale assessment of aquifer stress, recharge, and management options

Measuring transmissivity directly from pumping test data

Estimating electrical resistivity in vertical sounding surveys

Yes, the answer is correct.

Score: 1

Accepted Answers:

Basin-scale assessment of aquifer stress, recharge, and management options

Match the following doctrines to the suitable principles

Column A	Column B
1. Riparian Rights	A. "First in time, first in right" allocation system, senior users have priority
2.Prior Appropriation	B. State holds resources in stewardship for present and future generations
3. Public Trust Doctrine	C. Rights attached to land adjacent to a watercourse, reasonable use required
4. Doctrine of Capture	D. Whoever extracts groundwater first owns it, regardless of impact on neighbours

1–C, 2–A, 3–B, 4–D

1–B, 2–D, 3–C, 4–A

1–A, 2–B, 3–D, 4–C

1–D, 2–C, 3–A, 4–B

No, the answer is incorrect.

Score: 0

Accepted Answers:

1–C, 2–A, 3–B, 4–D

1 point

A farmer in 1900s India digs a well on his land and extracts water without seeking any government approval. Which legal framework allowed this action?

- Indian Easements Act, 1882
- Environment Protection Act, 1986
- Water (Prevention & Control of Pollution) Act, 1974
- National Water Policy, 2002

No, the answer is incorrect.

Score: 0

Accepted Answers:

Indian Easements Act, 1882

1 point

In India, groundwater ownership has traditionally been tied to:

- Community-based customary rights
- Riparian rights linked to surface water use
- Land ownership rights overlying the aquifer
- Government allocation based on licensing

No, the answer is incorrect.

Score: 0

Accepted Answers:

Land ownership rights overlying the aquifer

1 point

A state introduces a permit system requiring farmers to register all deep tube wells. Which principle of groundwater governance is being promoted?

- Demand-side management and regulation

Landowner autonomy

Riparian rights

Voluntary self-regulation

No, the answer is incorrect.

Score: 0

Accepted Answers:

Demand-side management and regulation

1 point

In a coastal aquifer shared by two states, over-extraction by one state leads to saline intrusion across the boundary. Which legal framework would most logically apply?

Interstate water disputes under Article 262 of the Indian Constitution

Panchayat Raj interstate institutional governance

Common law principles of nuisance between states

National Green Tribunal (NGT) only

No, the answer is incorrect.

Score: 0

Accepted Answers:

Interstate water disputes under Article 262 of the Indian Constitution

1 point

Which of the following allocation approaches best supports equity between smallholders and large farmers?

Depth-based extraction licenses

Pump horsepower restrictions

Groundwater trading markets without regulation

Land area–proportional extraction rights

No, the answer is incorrect.

Score: 0

Accepted Answers:

Land area–proportional extraction rights

1 point

A desert state allows unlimited private extraction of groundwater for agriculture, while banning industries from using groundwater. This is an example of:

Sectoral prioritization in allocation

Common-pool resource governance

Public trust doctrine implementation

Sectoral demand management with caps

No, the answer is incorrect.

Score: 0

Accepted Answers:

Sectoral prioritization in allocation

1 point

Which of the following best explains why legal groundwater allocation is more complex than surface water allocation?

Aquifers respond to pumping

Groundwater is invisible, and its flow boundaries are hard to define

Surface water laws are never enforced

Groundwater extraction affects ecosystems

No, the answer is incorrect.

Score: 0

Accepted Answers:

Groundwater is invisible, and its flow boundaries are hard to define

1 point

In the context of international law, transboundary aquifer management is guided primarily by:

UN International Law Commission Draft Articles (2008)

Kyoto Protocol

UN Paris Agreement

Rio Earth Climate Summit Declaration only

No, the answer is incorrect.

Score: 0

Accepted Answers:

UN International Law Commission Draft Articles (2008)

1 point

Which statement best distinguishes water quality regulations from water quality guidelines?

Regulations are voluntary, while guidelines are legally binding

Regulations are enforceable limits under law, while guidelines are advisory reference values

International agencies issue regulations, while national agencies issue guidelines

Regulations apply only to groundwater, while guidelines apply to both surface water and groundwater

No, the answer is incorrect.

Score: 0

Accepted Answers:

Regulations are enforceable limits under law, while guidelines are advisory reference values

1 point

A municipality delineates a wellhead protection area (WHPA) for its drinking water supply well. The aquifer is heterogeneous, with fractured zones providing rapid flow pathways, while clayey layers slow down contaminant migration. Due to limited resources, the city can enforce strict land-use restrictions in only one part of the WHPA. Which zone should be prioritized to maximize protection of the well?

- The clay-rich low-permeability zone, since contaminants move slowly and accumulate
- The fractured high-permeability zone, since contaminants can reach the well quickly
- The downstream portion of the WHPA, since contaminants are diluted before reaching the well
- Any zone is equally critical, since contaminant travel times are uniform across the aquifer

No, the answer is incorrect.

Score: 0

Accepted Answers:

The fractured high-permeability zone, since contaminants can reach the well quickly

1 point

The National Water Framework Bill, 2016, emphasizes which of the following principles?

- Water as private property linked to land ownership
- Basin-level planning and the public trust doctrine
- Industrial use of water as the highest priority
- Exclusive central government control over all rivers

No, the answer is incorrect.

Score: 0

Accepted Answers:

Basin-level planning and the public trust doctrine

1 point

Which government scheme in India is specifically designed to promote community-led sustainable groundwater management?

- Jal Jeevan Mission
- Atal Bhujal Yojana
- Namami Gange Programme
- PMKSY

No, the answer is incorrect.

Score: 0

Accepted Answers:

Atal Bhujal Yojana

1 point

Which international body is specifically dedicated to the assessment and governance of global groundwater resources, including the mapping of transboundary aquifers?

- UNESCO – International Hydrological Programme (IHP)
- UNEP – United Nations Environment Programme
- IGRAC – International Groundwater Resources Assessment Centre
- IPCC – Intergovernmental Panel on Climate Change

No, the answer is incorrect.

Score: 0

Accepted Answers:

IGRAC – International Groundwater Resources Assessment Centre

1 point

The slogan "*Catch the Rain, where it falls, when it falls*" is associated with which campaign?

- Jal Jeevan Mission

Atal Bhujal Yojana

Namami Gange

Jal Shakti Abhiyan

No, the answer is incorrect.

Score: 0

Accepted Answers:

Jal Shakti Abhiyan

Groundwater warming due to climate change is a concern mainly because:

It may reduce recharge efficiency

It enhances geochemical reactions and contaminant mobilization

It permanently raises aquifer permeability

It accelerates evaporation from deep aquifers

Yes, the answer is correct.

Score: 1

Accepted Answers:

It enhances geochemical reactions and contaminant mobilization

1 point

Which of the following is the most direct effect of climate change on groundwater recharge in semi-arid regions?

Reduced aquifer transmissivity

Increased evapotranspiration losses

Higher groundwater salinity due to pumping

Greater baseflow contributions to rivers

Yes, the answer is correct.

Score: 1

Accepted Answers:

Increased evapotranspiration losses

1 point

In a coastal aquifer, sea-level rise due to climate change is most likely to lead

- Lowering of the groundwater table
- Enhance freshwater storage
- Increase the risk of seawater intrusion
- Decrease land subsidence

Yes, the answer is correct.

Score: 1

Accepted Answers:

Increase the risk of seawater intrusion

1 point

Land subsidence due to groundwater withdrawal is primarily caused by:

- Aquifer recharge
- Expansion of clay minerals upon saturation
- Compaction of upper confining layers
- Increase in artesian pressure

Yes, the answer is correct.

Score: 1

Accepted Answers:

Compaction of upper confining layers

1 point

The most critical advantage of next-generation sensors for groundwater sustainability is:

Detecting contaminants at very low concentrations (parts-per-billion level)

Automatically desalinating groundwater in situ

Guaranteeing aquifer recharge after every pumping cycle

Ensuring aquifer homogeneity

Yes, the answer is correct.

Score: 1

Accepted Answers:

Detecting contaminants at very low concentrations (parts-per-billion level)

1 point

A hydrogeologist applies a machine learning model to classify aquifer vulnerability zones. Which dataset feature is least relevant?

Depth to water table

Soil permeability

Rainfall variability

Farmer’s crop preference

Yes, the answer is correct.

Score: 1

Accepted Answers:

Farmer’s crop preference

1 point

Future groundwater governance frameworks increasingly emphasize:

Centralized, top-down management only

Decentralized, participatory, basin-level planning

Exclusive industrial prioritization of water use

Integrated water management

No, the answer is incorrect.

Score: 0

Accepted Answers:

Decentralized, participatory, basin-level planning

1 point

The application of AI/ML in groundwater management is LEAST likely to be used for:

Manually drilling new groundwater wells.

Predicting aquifer recharge rates using climate models.

Analyzing satellite data to detect land subsidence.

Optimizing pumping schedules to reduce energy costs.

Yes, the answer is correct.

Score: 1

Accepted Answers:

Manually drilling new groundwater wells.

1 point

Which limitation must be acknowledged when applying AI-driven digital twins in groundwater?

They can perfectly replicate subsurface heterogeneity without calibration

They require extensive real-time monitoring data and high computational resources

They permanently eliminate the need for hydrogeologists

They guarantee aquifer resilience under any climate scenario

Yes, the answer is correct.

Score: 1

Accepted Answers:

They require extensive real-time monitoring data and high computational resources

1 point

Effective governance for sustainable groundwater management fundamentally requires:

A framework of policies, regulations, and stakeholder engagement.

Focusing solely on increasing the supply through desalination.

The privatization of all groundwater resources.

Reducing all agricultural use of groundwater.

Yes, the answer is correct.

Score: 1

Accepted Answers:

A framework of policies, regulations, and stakeholder engagement.

1 point

How can AI/ML applications directly help mitigate the impacts of climate change on groundwater?

By analysing the chemical composition of greenhouse gases.

By creating more precise hydrological models that forecast water availability under different climate scenarios.

By monitoring sea-level rise from intruding into coastal aquifers.

By controlling global weather patterns to prevent droughts.

Yes, the answer is correct.

Score: 1

Accepted Answers:

By creating more precise hydrological models that forecast water availability under different climate scenarios.

1 point

Over 15 years, a drought-prone basin has shown declining groundwater storage despite the expansion of canal irrigation. Monitoring wells in the alluvial zone indicate seasonal recovery, while wells in the adjacent hard-rock zone continue to show long-term decline. Which factor best explains this contrasting trend?

Variation in aquifer properties influencing recharge and discharge

Uniform seepage from canals into all aquifers

Decline in pumping across the entire basin

Consistent canal inflows throughout the period

Yes, the answer is correct.

Score: 1

Accepted Answers:

Variation in aquifer properties influencing recharge and discharge

1 point

Based on Q12, policymakers propose the Interlinking of Rivers (ILR) to expand canal networks nationally. From a groundwater perspective, which outcome is most realistic?

Uniform recharge across all linked aquifers

Enhanced recharge in favorable geological settings, but limited benefit in less permeable terrains.

Permanent stabilization of groundwater regardless of pumping stress

Elimination of the need for local-scale water governance

Yes, the answer is correct.

Score: 1

Accepted Answers:

Enhanced recharge in favorable geological settings, but limited benefit in less permeable terrains.

1 point

Match the following methods to suitable applications

Methods	Applications
1. Decision Tree	A. Non-linear plume dynamics and contaminant spread
2. Random Forest	B. Classification of contaminated vs safe zones
3. ANN	C. Vulnerability mapping, simple but prone to overfitting
4. SVM	D. Stable predictions for recharge and quality trends
5. LSTM	E. Spatial pattern recognition
6. CNN	F. Time-series forecasting

1C, 2D, 3A, 4B, 5F, 6E

1A, 2B, 3D, 4C, 5E, 6F

1B, 2C, 3E, 4F, 5A, 6D

1F, 2E, 3B, 4A, 5C, 6D

Yes, the answer is correct.

Score: 1

Accepted Answers:

1C, 2D, 3A, 4B, 5F, 6E

1 point

Digital twins in groundwater management are most valuable because they

- Provide static snapshots of aquifer conditions
- Simulate real-time aquifer behavior and allow predictive scenario testing
- Replace the need for field data collection entirely
- Guarantee uniform recharge across all regions

Yes, the answer is correct.

Score: 1

Accepted Answers:

Simulate real-time aquifer behavior and allow predictive scenario testing

1 point

Coupled surface water–groundwater models with climate feedback loops are primarily aimed at:

- Predicting aquifer heterogeneity
- Anticipating future stresses under climate change scenarios
- Eliminating pumping restrictions
- Ensuring recharge occurs uniformly each year

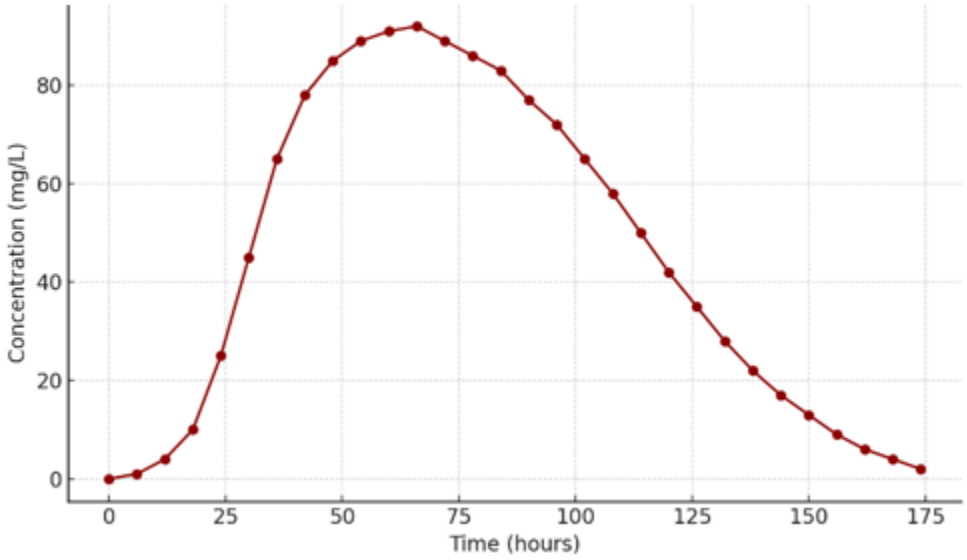
Yes, the answer is correct.

Score: 1

Accepted Answers:

Anticipating future stresses under climate change scenarios

Observe the breakthrough curve given below. Which of the following statements is most appropriate regarding the observed transport behaviour in the subsurface?



The early arrival and steep peak suggest the aquifer is homogeneous and isotropic

The trailing edge indicates limited mechanical dispersion and confirms single flow path dominance

The fluctuations in peak and persistence of tracer concentration suggest heterogeneity and multiple flow velocities

The time to peak concentration reflects effective porosity but is unrelated to aquifer structure

Yes, the answer is correct.

Score: 1

Accepted Answers:

The fluctuations in peak and persistence of tracer concentration suggest heterogeneity and multiple flow velocities

1 point

If the peak concentration is reached at 60 hours (Refer the graph given in Q 1) and the observation well is located 10 meters from the injection point. If the effective porosity is 0.25, determine the Darcy velocity.

0.25 m/day

4 m/day

1 m/day

10 m/day

Yes, the answer is correct.

Score: 1

Accepted Answers:

1 m/day

1 point

The constant head test is best suited for:

Clays

Silts

Clean sands and gravels

Peat soils

Yes, the answer is correct.

Score: 1

Accepted Answers:

Clean sands and gravels

1 point

Which combination of properties is most essential in the empirical estimation of K using Kozeny-Carman?

Grain size and water content

Porosity and specific surface area

Hydraulic gradient and viscosity

Total head and unit weight

Yes, the answer is correct.

Score: 1

Accepted Answers:

Porosity and specific surface area

1 point

A pumping test shows K = 3 × 10

−3

m/s, but lab tests on the same soil give 3 × 10

−5

m/s. Which of the following cannot explain this discrepancy?

Sample disturbance

Macropores in field

Field-scale heterogeneity

Laboratory measurement in saturated conditions

Yes, the answer is correct.

Score: 1

Accepted Answers:

Laboratory measurement in saturated conditions

1 point

In an aquifer, K is calculated using Darcy's law with head gradient = 0.01, discharge = 2 m

3

/day, cross-sectional area = 10 m

2

. What is K?

- 0.2 m/day
- 2.0 m/day
- 20 m/day
- 200 m/day

Yes, the answer is correct.

Score: 1

Accepted Answers:

20 m/day

1 point

What causes the effective porosity to differ from total porosity?

- Saturation
- Hydraulic gradient
- Presence of dead-end pores
- Grain shape

Yes, the answer is correct.

Score: 1

Accepted Answers:

Presence of dead-end pores

1 point

In a falling head permeameter test, which of the following parameters is *not* required to estimate hydraulic conductivity?

- Length of the soil specimen

Diameter of the soil specimen

Cross-sectional area of the standpipe

Final moisture content of the soil

Yes, the answer is correct.

Score: 1

Accepted Answers:

Final moisture content of the soil

1 point

Which of the following combinations will give you porosity (n)?

Bulk density and viscosity

Particle density and permeability

Bulk density and particle density

Saturation and permeability

Yes, the answer is correct.

Score: 1

Accepted Answers:

Bulk density and particle density

1 point

A confined aquifer has transmissivity of 500 m

2

/day and saturated thickness of 20 m. What is the hydraulic conductivity?

25 m/day

0.04 m/day

10 m/day

10000 m/day

Yes, the answer is correct.

Score: 1

Accepted Answers:

25 m/day

1 point

A tracer test is performed in a groundwater aquifer. At a monitoring well located 15 meters down-gradient from the injection well, the tracer concentration was measured after 50 hours. The initial injected concentration was

C_0 =200 mg/L and the observed concentration at 50 hours is C=100 mg/L. Calculate the seepage velocity (m/hr) at these locations. (Use $\pi \approx 3.14$)

0.033

0.21

0.33

0.66

Yes, the answer is correct.

Score: 1

Accepted Answers:

0.33

1 point

Which laboratory method is most appropriate for estimating the hydraulic conductivity of fine-grained soils such as silts and clays?

- Constant head permeameter test
- Falling head permeameter test
- Triaxial compression test
- Oedometer test

Yes, the answer is correct.

Score: 1

Accepted Answers:

Falling head permeameter test

1 point

A pumping well is located in a confined aquifer with a transmissivity of 90 m

2

/day and a storativity of 0.004. If the pumping rate is 400 m

3

/day and the pumping continues for 7 days, what is the radius of influence (R) of the well?

- 70 m
- 200 m
- 500 m
- 595 m

Yes, the answer is correct.

Score: 1

Accepted Answers:

595 m

1 point

Which field test gives the most direct and large-scale estimate of hydraulic conductivity?

Tracer test

Laboratory permeameter test

Pumping test

Empirical porosity estimation

Yes, the answer is correct.

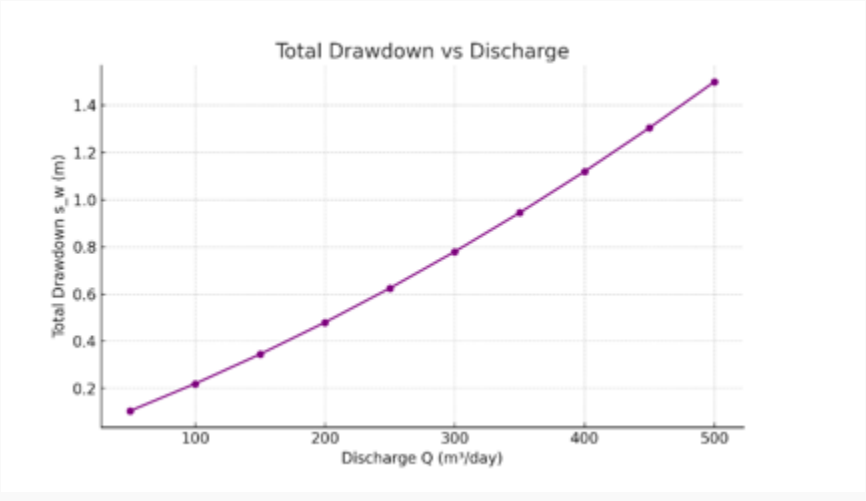
Score: 1

Accepted Answers:

Pumping test

1 point

The graph provided shows the relationship between total drawdown and discharge rate (Q) for a pumping well in a confined aquifer. Which of the following best explains the behavior observed in the graph?



Total drawdown increases linearly with Q, implying aquifer loss dominates

The system follows a Darcy-type flow regime across all discharge values

Drawdown increases non-linearly with Q due to growing well losses near the wellbore

The curve shape indicates decreasing specific storage with increasing discharge

Yes, the answer is correct.

Score: 1

Accepted Answers:

Drawdown increases non-linearly with Q due to growing well losses near the wellbore

1 point

Using any two visible points on the graph (refer the above graph), estimate the most appropriate values of the aquifer loss coefficient B and the well loss coefficient C

B = 0.002 day/m

2

C = 2 × 10

−6

day

2

/m

5

B = 0.0015 day/m

2

C = 3 × 10

−6

day

2

/m

5

B = 0.003 day/m

2

C = 1 × 10

−6

day

2

/m

5

B = 0.005 day/m

2

C = 1.5 × 10

−6

day

2

/m

5

No, the answer is incorrect.

Score: 0

Accepted Answers:

B = 0.002 day/m

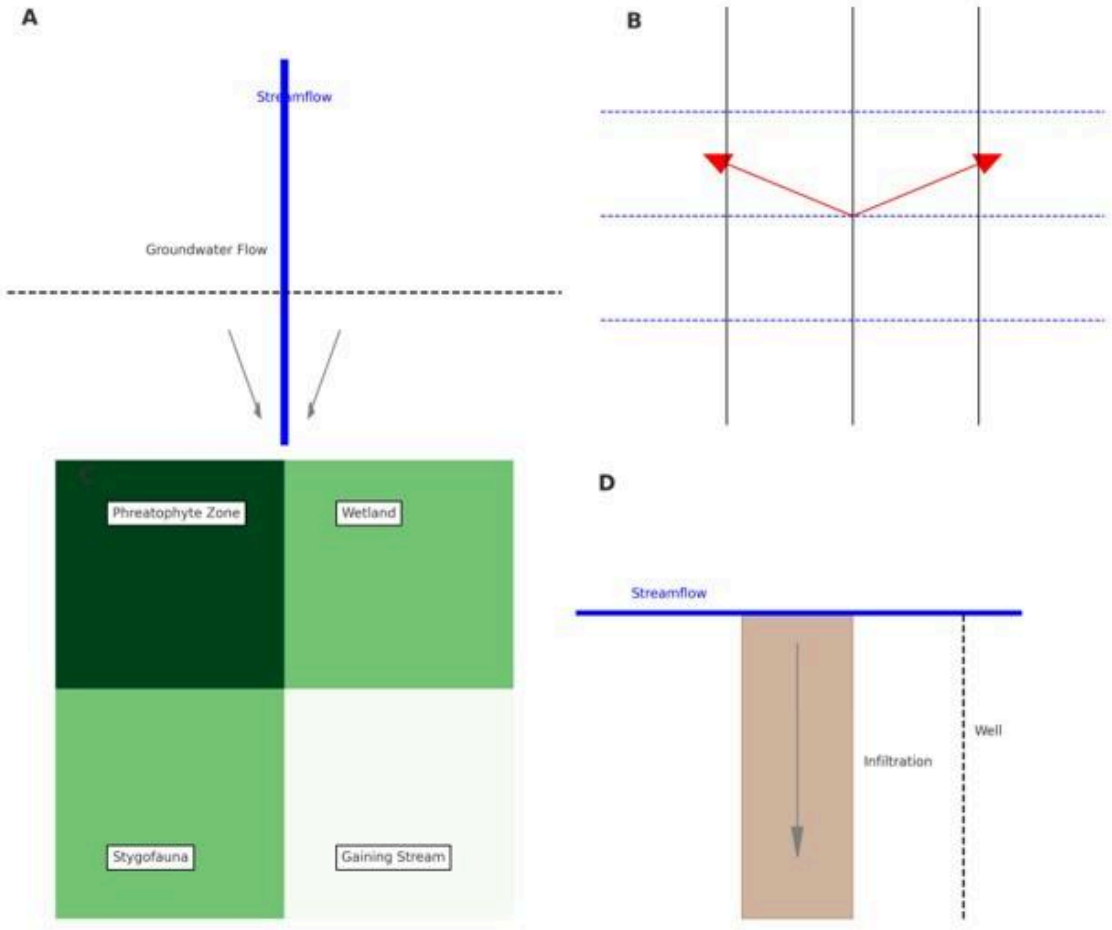
2

$C = 2 \times 10^{-6} \frac{day}{2/m^5}$

Due on 2025-08-20, 23:59 IST.

As per our records you have not submitted this assignment.

Observe the figure below (A–D) and answer Questions 1 to 4



1 point

What type of surface water–groundwater interaction is represented in Diagram A

- Influent stream
- Effluent stream
- Perched stream
- Disconnected stream

No, the answer is incorrect.

Score: 0

Accepted Answers:

Effluent stream

1 point

Diagram B shows a flow net pattern with diverging flow lines. What hydrogeological condition is being represented?

- Cone of depression from overpumping
- Artificial recharge mound
- Subsurface barrier
- Groundwater stagnation zone

No, the answer is incorrect.

Score: 0

Accepted Answers:

Artificial recharge mound

1 point

Different Groundwater Dependent Ecosystems (GDEs) are illustrated in diagram C. Which ecosystem is best represented by the zone labelled “Stygofauna”?

- Riverine GDE

Wetland GDE

Aquifer GDE

Terrestrial GDE

No, the answer is incorrect.

Score: 0

Accepted Answers:

Aquifer GDE

1 point

Based on diagram D, what process is being depicted between the stream and the underlying aquifer?

Effluent groundwater discharge

Surface runoff accumulation

Stream leakage and infiltration

Upward flow from an artesian aquifer

No, the answer is incorrect.

Score: 0

Accepted Answers:

Stream leakage and infiltration

1 point

In an arid region, what is the likely interaction between surface water and groundwater?

Groundwater discharges into streams

Streams contribute to groundwater recharge

No interaction exists

Groundwater and surface water rise simultaneously

No, the answer is incorrect.

Score: 0

Accepted Answers:

Streams contribute to groundwater recharge

1 point

Match the following types of Groundwater Dependent Ecosystems (GDEs) with their examples:

GDE Type	Function
1. Riverine GDE	A. Discharges groundwater through isolated outlets
2. Wetland GDE	B. Influences estuarine salinity and nutrients
3. Spring GDE	C. Supports streamflow during dry periods
4. Coastal GDE	D. Hosts vegetation in saturated zones

1-C, 2-D, 3-A, 4-B

1-A, 2-B, 3-D, 4-C

1-D, 2-A, 3-B, 4-C

1-B, 2-C, 3-A, 4-D

No, the answer is incorrect.

Score: 0

Accepted Answers:

1-C, 2-D, 3-A, 4-B

1 point

Which method is most suitable for estimating groundwater recharge from a river reach?

Theis recovery method

Darcy’s law using head differences

Water table fluctuation method

Seepage meter measurement

No, the answer is incorrect.

Score: 0

Accepted Answers:

Seepage meter measurement

1 point

What does a nested flow net in a humid region typically indicate?

Influent interaction with seasonal drying

Effluent condition with convergence of flow lines

Recharge mound forming under an arid zone

Perched water zone with low hydraulic head

No, the answer is incorrect.

Score: 0

Accepted Answers:

Effluent condition with convergence of flow lines

1 point

In a flow net diagram, what do closely spaced equipotential lines indicate?

High permeability

Steep hydraulic gradient

An impermeable layer

Low recharge rate

No, the answer is incorrect.

Score: 0

Accepted Answers:

Steep hydraulic gradient

1 point

Which of the following is NOT a method to identify GDEs?

Biotic assemblages

NDVI analysis

Electrical resistivity tomography

Tracers and isotopes

No, the answer is incorrect.

Score: 0

Accepted Answers:

Electrical resistivity tomography

1 point

Which Sustainable Development Goal (SDG) is most directly linked to the protection and sustainable management of groundwater-dependent ecosystems (GDEs)?

SDG 1

SDG 6

SDG 13

SDG 15

No, the answer is incorrect.

Score: 0

Accepted Answers:

SDG 6

1 point

In a humid region, which of the following trends is most likely observed over long-term monitoring of the water table near a perennial stream?

Gradual decline due to evapotranspiration

Periodic fluctuations with rising trend

Continuous lowering due to pumping

Stable or slightly rising levels with wet season recharge

No, the answer is incorrect.

Score: 0

Accepted Answers:

Stable or slightly rising levels with wet season recharge

1 point

Which of the following is a limitation of using NDVI (Normalized Difference Vegetation Index) in identifying GDEs?

Cannot differentiate vegetation types

Requires field validation to confirm groundwater dependence

Only works in arid zones

Requires very high-resolution topography

No, the answer is incorrect.

Score: 0

Accepted Answers:

Requires field validation to confirm groundwater dependence

1 point

A stream in a semi-arid region shows flow only during monsoon and loses water to the subsurface. Which type of interaction is likely?

- Effluent
- Influent
- Perched aquifer
- Artesian discharge

No, the answer is incorrect.

Score: 0

Accepted Answers:

Influent

1 point

Which of the following is most suitable to quantify recharge under natural conditions in a humid catchment area?

- Specific yield × Rise in water table
- Rainfall – Runoff
- Darcy velocity × aquifer area
- Volume of abstraction

No, the answer is incorrect.

Score: 0

Accepted Answers:

Specific yield × Rise in water table

1 point

You are monitoring a stream–aquifer system with temperature and EC sensors. A sudden drop in stream temperature and increase in EC in nearby wells is observed. What could be a likely interpretation?

Infiltration of stream water

Evaporation from stream

Deep upwelling from aquitard

Hydraulic barrier formation

No, the answer is incorrect.

Score: 0

Accepted Answers:

Infiltration of stream water

1 point

Which parameter best represents the potential for groundwater discharge to a stream?

Aquifer storativity

Hydraulic conductivity

Hydraulic gradient toward stream

Transmissivity × Gradient

No, the answer is incorrect.

Score: 0

Accepted Answers:

Transmissivity × Gradient

1 point

In a reach where both streamflow and groundwater levels are monitored, which observation indicates stream leakage into the aquifer?

Stream stage above nearby groundwater level

Groundwater level higher than stream

Equal heads but no flow

Stream stage fluctuates independently of groundwater

No, the answer is incorrect.

Score: 0

Accepted Answers:

Stream stage above nearby groundwater level

1 point

Which of the following SDGs indirectly reinforces GDE protection by promoting biodiversity and ecological resilience?

SDG 6

SDG 9

SDG 13

SDG 15

No, the answer is incorrect.

Score: 0

Accepted Answers:

SDG 15

1 point

If a tracer test in a stream–aquifer system shows a recovery rate of 40%, what does this most likely indicate?

High evapotranspiration loss

Strong dilution in the aquifer

Partial recharge with preferential pathways

No connectivity

No, the answer is incorrect.

Score: 0

Accepted Answers:

Partial recharge with preferential pathways