Irrigation Past Questions by LokSewa

1. The drain line above the canal line is called..... [सुदूरपश्चिम प्रदेश चौथो तह 2080/06/27]

a. level crossing **b. super passage** **c. siphon** **d. siphon aqueduct**

- super passage

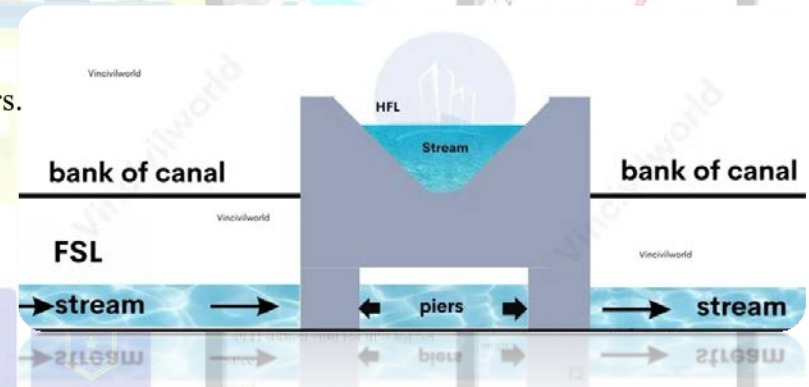
a. Level Crossing:

✓ Canal and drainage approach at practically the same level.

✓ Drainage passes through the canal.

✓ Intermingling of canal and drainage water occurs.

✓ Regulators control water supply levels.



b. Super Passage:

✓ Drainage carried over the canal.

✓ Canal flows below with free surface.

✓ Canal FSL is lower than the drainage trough.

c. Siphon:

✓ Canal water flows under pressure.

✓ Flows through barrels below the drainage trough.

✓ Canal bed is depressed.

d. Siphon Aqueduct:

✓ Canal carried over the drainage.

✓ Drainage water flows under pressure.

✓ Drainage bed is usually depressed.

✓ Drainage HFL is higher than the canal bed.

2. Which type of irrigation method delivers water directly to the root of plant ? [सुदूरपश्चिम प्रदेश चौथो तह 2080/06/27]

a. surface irrigation b. sprinkler irrigation c. drip irrigation d. furrow irrigation

- drip irrigation

Explanation:

✓ Surface Irrigation

Surface irrigation involves water flowing across the field using gravity, typically through furrows, borders, or basins. It is suitable for flat or mildly sloping lands with medium to low infiltration soils like clay or loam. It is less expensive and works well with sediment-laden water but requires land leveling and can lead to uneven water distribution.

✓ Sprinkler Irrigation

Sprinkler irrigation sprays water over crops using high pressure. It is ideal for sandy soils with high infiltration rates, uneven slopes, and areas with limited water supply. However, it is less effective in windy conditions and requires higher initial investment.

✓ Drip Irrigation

Drip irrigation delivers water directly to the root zone in small amounts. It is highly efficient, suitable for all soil types, steep slopes, and areas with saline water. It is ideal for high-value crops like vegetables but requires maintenance to prevent clogging.

✓ Furrow Irrigation

A type of surface irrigation where water flows through channels (furrows). Suitable for row crops like maize and vegetables on flat or mildly sloping lands. It provides better control but risks salt build-up and runoff

3. Irrigation is required to..... [इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. increase food production b. increase employment c. increase income of the farmers d. all of the above

- all of the above

4. Which of the following irrigation method uses minimum water ? [इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. drip irrigation b. Canal irrigation c. free flooding d. sprinkler irrigation

- drip irrigation

Explanation:

Drip irrigation: It is a type of irrigation method that has an optimum level of water supply, less requirement of water when compared to other irrigation methods, and water is conveyed through a system of flexible pipes operating at low pressure.

5. When a Canal is carried over a natural drainage the provide structure is known as..... [इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. syphon **b. aqueduct** **c. super passage** **d. syphon aqueduct**

- aqueduct

Explanation:

Aqueduct:

✓ Canal carried over a drainage.

✓ Bridge-like structure for canal.

✓ Drainage water flows freely below.

✓ Canal bed level is above the highest flood level (HFL) of the drain.

✓ Maintenance is relatively easy.

Syphon Aqueduct:

✓ Aqueduct where the drainage bed is depressed.

✓ Stream water flows under pressure below the canal.

✓ HFL of the drain is higher than the canal bed.

✓ Utilizes syphonic action for drainage flow.

✓ Stream bed usually has a concrete or masonry floor.

6. By constructing which structure we can help the fish in their migration ? [इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. scouring sluices **b. silt excluder** **c. fish ladder** **d. divide wall**

- fish ladder

Explanation:

a. Scouring Sluices:

✓ Gate-controlled openings in the weir.

✓ Located on the canal off-take side.

✓ Low crest level.

✓ Function: Clear silt from the front of the head regulator and control silt entry into the canal.

✓ Help maintain a defined river channel.

b. Silt Excluder:

✓ Sediment control device.

✓ Built on the river bed, upstream of the head regulator.

✓ Purpose: Prevent coarse sediment from entering the canal.

✓ Consists of under tunnels.

✓ Clearer water enters the canal over the tunnels.

c. Fish Ladder:

✓ Structure to help fish move upstream.

✓ Dissipates flow energy for smooth, low-velocity flow.

✓ Located near the divide wall and undersluices.

✓ Can be adjacent to or within the divide wall.

d. Divide Wall:

✓ Wall along the canal head regulator.

✓ Separates weir bays from undersluice bays.

✓ Separate scouring sluice floor from the weir.

✓ Isolate pocket for scouring.

✓ Concentrate scouring action.

✓ Minimize sediment entry to canal.

✓ Prevent cross-currents.

✓ Create a still pocket for clearer water intake.

✓ Can form a side of the fish ladder.

✓ Prevent damage from downstream cross flow.

7. Which of the following type of irrigation methods uses artificial rain to irrigate the land ?

[इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. border irrigation method **b. furrow irrigation method** **c. sprinkler irrigation method** **d. drip irrigation method**

- sprinkler irrigation method

Explanation:

a. Border Irrigation:

✓ Land divided into strips by low levees (borders).

✓ Water flows down the slope within each strip.

✓ Suitable for crops like wheat, leafy vegetables, fodders.

✓ Requires proper land preparation for uniform water distribution.

✓ Water diverted from a head ditch into the strips.

b. Furrow Irrigation:

✓ Water flows in small channels (furrows) between crop rows.

✓ Water infiltrates into the soil as it moves along the slope.

✓ Crops grown on ridges between furrows.

✓ Suitable for row crops and those not tolerating long periods of inundation (e.g., cotton, sugarcane, potatoes).

✓ Wets only one-half to one-fifth of the land surface.

c. Sprinkler Irrigation:

✓ Water applied as a spray through a network of pipes and pumps.

✓ Acts as artificial rain.

✓ Suitable where water is scarce and for uneven topography.

✓ Different systems: fixed nozzle, perforated pipe, rotating sprinklers.

✓ Can have high application efficiency but affected by wind.

d. Drip Irrigation:

✓ Water applied slowly, directly to the root zone.

✓ Uses a system of small diameter plastic pipes with emitters (drippers).

✓ Very low application rates (2–20 liters per hour).

✓ Maintains a favorable high moisture level in the root zone.

✓ Suited for areas with water scarcity, poor water quality, steep land, and for high-value crops like orchard trees.

✓ Minimizes evaporation and percolation losses.

8. Lining of the irrigation channels..... [इन्जिनियरिङ सेवा, सिभिल समूह, सहायकस्तर चौँथो तह 2080/01/23]

a. increase the water logging area b. decrease the water logging area c. does not change in the water logging area d. none of above

- decrease the water logging area

Explanation:

How lining a canal can decrease water logging?

✓ Reduces Seepage into Surrounding Soil

— Canal lining creates an impermeable barrier (e.g., concrete, asphalt) that significantly limits water seepage from the canal bed and sides, which is the primary cause of rising groundwater levels and waterlogging.

✓ Prevents Groundwater Table Rise and Land Saturation

— By minimizing seepage, lining helps maintain a safe groundwater depth and prevents saturation of adjacent lands, reducing the risk of waterlogging in nearby agricultural areas.

✓ Lowers the Need for Artificial Drainage

— With reduced subsurface water accumulation, the demand for costly drainage infrastructure decreases.

9. The canal from intake to foreBay is... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. main canal b. head race canal c. tail race canal d. pondage canal

- head race canal

Explanation:

a. Main Canal:

✓ Generally carries water directly from a river or reservoir.

✓ Carries heavy supplies.

✓ Not typically used for direct irrigation.

✓ Feeds branch canals and major distributaries.

✓ Aligned along a ridge and somewhat central to the command area.

✓ Has a head regulator at its start.

b. Head Race Canal:

✓ In a hydroelectric scheme, takes water from the river (via weir or dam).

✓ Conveys water to a forebay near the powerhouse.

c. Tail Race Canal:

✓ In a hydroelectric scheme, carries water away from the powerhouse.

d. Pondage Canal:

✓ canal system that is designed to store a small amount of water temporarily, typically behind a structure like a weir or dam.

✓ This stored water, called pondage, is used during periods of high demand or when the main water source is unavailable.

✓ It ensures a steady supply of irrigation water and can also help regulate fluctuations in water flow.

10. The main function of a diversion head works of a Canal from a river is..... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

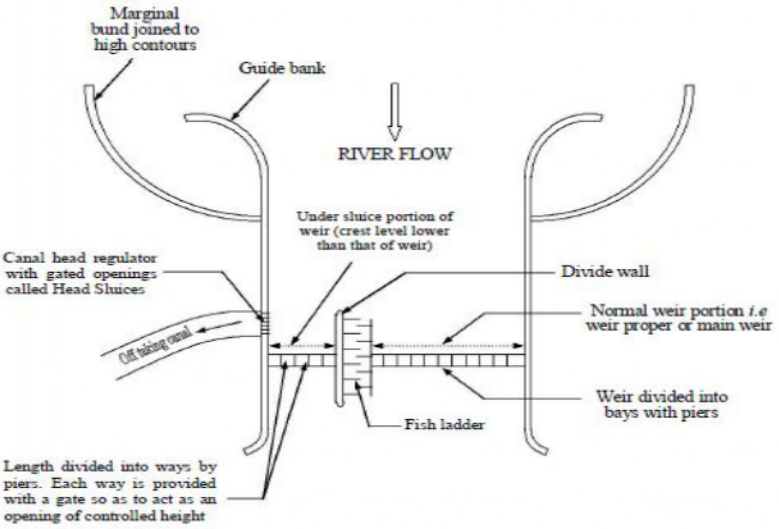
a. to remove silt **b. to control floods** **c. to raise water level** **d. to store water**

- to raise water level

Explanation:

Functions of a Diversion Headworks:

- ✓ Diverts river water into the canal.
- ✓ Raises river water level to enable gravity flow into the canal.
- ✓ Regulates water intake into the canal.
- ✓ Controls silt entry into the canal.
- ✓ Reduces river supply fluctuations.
- ✓ Provides limited water storage for short shortages.



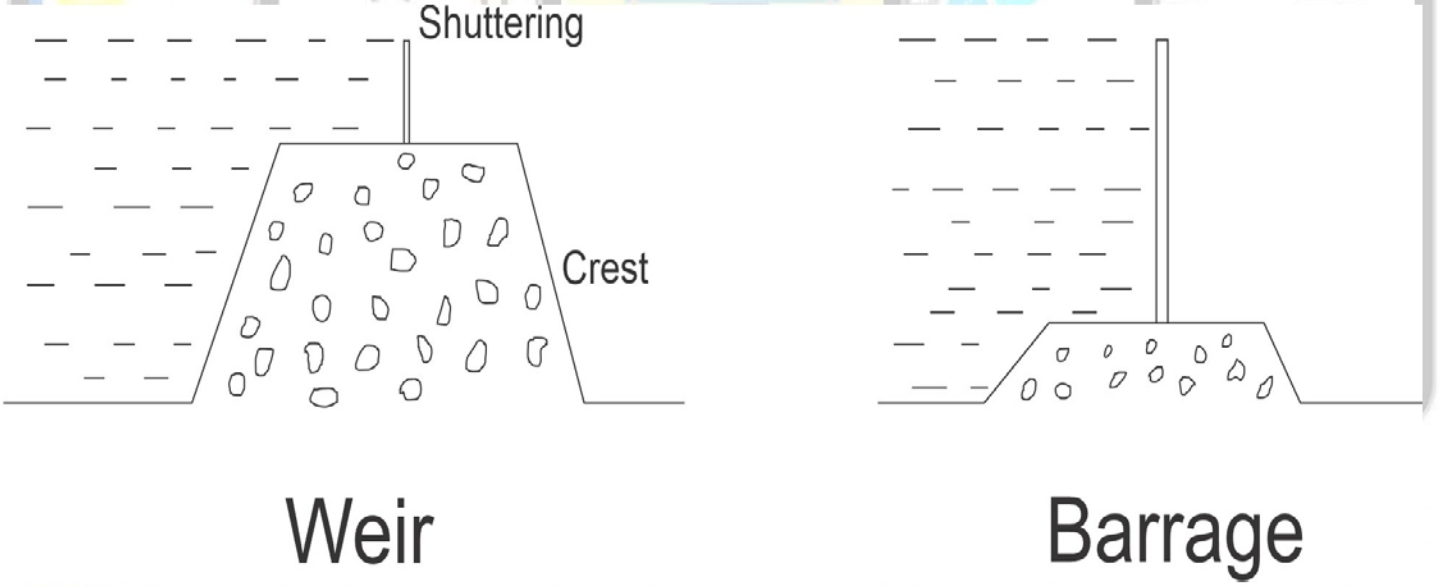
11. In a Barrage the crest level is kept..... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. low with large Gates **b. high with large Gates** **c. high with no Gates** **d. low with no Gates**

- low with large Gates

Explanation:

In a barrage, the crest level is generally kept at a low level. The heading up of water is primarily achieved by the gates rather than a solid obstruction like in a weir



12. For cereal crops the most commonly adopted method of irrigation is.... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. free flowing method **b. check method** **c. furrow method** **d. sprinkling method**

- check method

Explanation:

Method of Irrigation	Suitability
Free Flooding	Suitable for close-growing crops, pastures, especially on steep land.
Border Flooding	Suitable for both permeable and non-permeable soils.
Basin/Check Flooding	Suitable for heavy soils with low water absorption. Ideal for crops like mangoes, cereals, and fruits.
Drip/Trickling Irrigation	Suitable for arid and semi-arid regions.
Sprinkle Irrigation	Suitable for all types of soils. Ideal for crops needing humidity control (e.g., tobacco) or shallow roots (e.g., cabbage, lettuce).

13. Which one of the following is not divided in the types of in irrigation ? [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. Sprinkle irrigation **b. check flooding method** **c. river flooding** **d. free flooding method**

- river flooding

Explanation:

✓ Sprinkler Irrigation

— Mimics natural rainfall by spraying water through sprinklers connected to a pressurized pipe system.

— Ensures uniform water distribution at a rate below the soil's infiltration capacity, preventing runoff.

— Suitable for all types of terrain and soil.

✓ Check Flooding

— Involves dividing land into level plots surrounded by low levees.

— Water is released into each plot from the higher end and stopped when the area is saturated.

— Offers controlled flooding and is more efficient than free flooding.

✓ Free Flooding

— Water is allowed to flow freely over natural terrain without control structures.

— Common in inundation systems where water is abundant.

— Often inefficient and wasteful, suitable only where water is cheap and plentiful.

14. The micro hydro power installed capacity..... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. 100 KW **b. 125 KW** **c. 150 KW** **d. 200 KW**

- 100 KW

Category	**Capacity**
Micro	≤100 kW

Category	Capacity
Mini	100–1000 kW
Small	1–25 MW
Medium	25–100 MW
Large	>100 MW

15. What is the reason to provide silt excluder ? [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. to allow heavy silt to enter the canal **b. to prevent fine silt to enter the canal** **c. to allow the fine silt to enter the canal** **d. to prevent heavy silt to enter the canal**

- to prevent heavy silt to enter the canal

Explanation:

Silt Excluder

✓ Built on the river bed, upstream of the head regulator.

✓ Prevents sediment entry into the canal by removing silt-laden bottom layers.

✓ Uses tunnels beneath the riverbed that discharge near undersluices.

✓ Tunnel roof is aligned with the regulator crest to admit clearer surface water into the canal.

As opposed to an excluder a silt ejector is:

✓ Built within the canal, just downstream of the head regulator.

✓ Acts as a curative measure to remove sediment that enters the canal.

✓ Uses a diaphragm above the bed to separate silt-laden bottom flow.

✓ Tunnels or compartments below the diaphragm extract the silted water.

✓ Extracted silt is discharged through an escape channel.

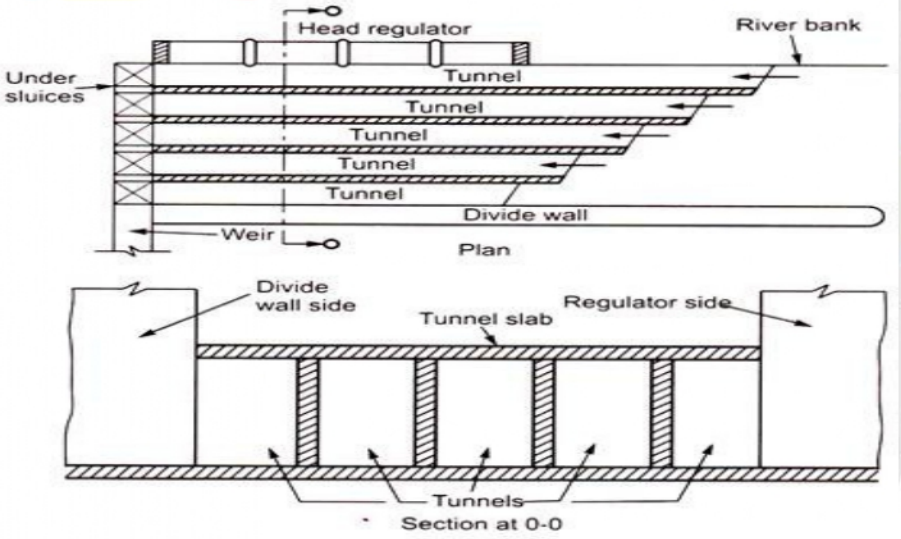


Fig. 5.11 Silt excluder

16. Meandering of river is due to..... [कर्णाली प्रदेश सहायकस्तर चौँथो तह 2079/03/22]

a. sediment load of streams b. discharge and Hydraulic properties of streams c. erodibility of the bed and banks of streams d. the natural topography of the location

- erodibility of the bed and banks of streams

Explanation:

All of the options given have a role in the meandering of a river. However option (c) is the best. This is because meandering primarily results from the erosion of the outer banks and deposition on the inner banks of curves. If the banks are easily erodible, the river can shift its course more readily, promoting the formation and evolution of meanders. While discharge, sediment load, and topography contribute, bank and bed erodibility is the key driver.

17. When a Canal passes below a drain with normally pipe flow the structure is known as..... [लुम्बिनी प्रदेश सहायकस्तर चौथो तह 2080/03/16]

a. tunnel b. super passage c. aqueduct d. syphon

- syphon

Explanation:

✓A canal syphon is a type of cross-drainage work

✓ It carries canal water below a drainage

✓ Flow is under siphoning pressure

✓ The canal bed is depressed, with a ramp at the exit to reduce silting

✓ Functions as a syphon, using siphonic action

✓ Used when FSL of canal is well above drainage bed

✓ aka a "canal syphon"

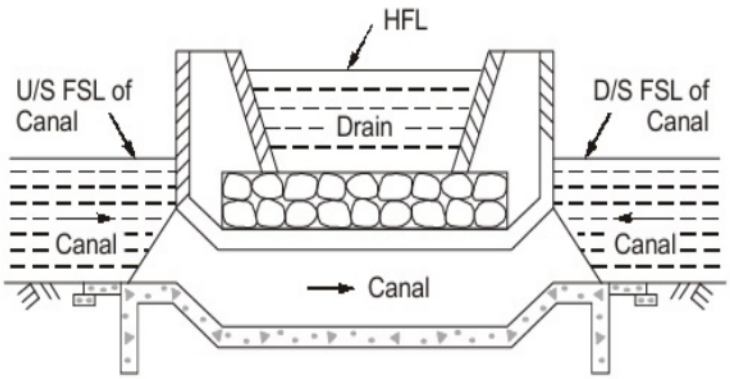


Fig. Typical cross-section of a canal syphon (generally called a syphon)

18. Base period of Crop generally given in..... [लुम्बिनी प्रदेश सहायकस्तर चौथो तह 2080/03/16]

a. days **b. year** **c. weeks** **d. season**

- days

Explanation:

✓ Base Period: Time from first irrigation to last before harvest.

✓ Crop Period: Time from sowing to harvesting.

✓ Base period is slightly shorter than crop period.

✓ For practical purposes, they are often treated the same.

✓ Base period is key in duty and delta calculations.

✓ Kor period: Part of base period with highest water demand.

✓ Canal capacity is designed considering kor period peak discharge.

Crop	Base Period	Key Details
Paddy (Rice)	120–160 days	Short-duration varieties: 100–120 days; medium: 120–140 days; long: 160+ days.
Maize	90–120 days	Common in Terai and hills; often intercropped with legumes.
Wheat	120–150 days	Winter crop in irrigated hills; follows rice in rotation.
Potato	90–120 days	Grown in high-altitude hills (2,500–3,500 m); limited to one crop annually.
Vegetables	30–90 days	Crops like cauliflower, cabbage, and tomatoes vary by season and variety.
Fruits	Varies	Apple: 1–2 years (from planting); Orange: 3–5 years.
Pulses	60–90 days	Lentil, chickpea, and pigeon pea dominate; yield depends on water availability.
Barley	120–150 days	Grown in high-altitude hills; often paired with buckwheat.

19. Canal losses are..... [लुम्बिनी प्रदेश सहायकस्तर चौथो तह 2080/03/16]

a. losses water in Canal **b. seepage water in Canal** **c. evaporate water in Canal**

d. all of the above

- all of the above

Explanation:

Evaporation Losses

✓ Water loss from the canal surface due to conversion into vapor.

✓ Generally a small percentage of total loss.

✓ Depends on climatic factors (temperature, humidity, wind) and canal factors (surface area, depth, velocity).

Transpiration Losses

✓ Water loss due to vegetation and weed growth along canal banks.

✓ Usually a very small part of the total loss.

Seepage Losses

✓ Water loss through the canal bed and sides into the ground.

✓ Major portion of loss in unlined canals.

✓ Occurs due to absorption into upper soil layers and percolation into the water table.

✓ Percolation losses are usually more significant than absorption.

✓ Depends on factors like subsoil water-table position, soil porosity, absorbing medium extent, canal cross-section design, water depth, velocity, temperature, and silt in suspension.

These losses are also collectively known as transmission losses or conveyance losses.

20. तलका मध्ये कुन सिँचाइ विधि होइन ? [लुम्बिनी प्रदेश सहायकस्तर चौथो तह 2080/03/16]

a. contour irrigation or control lateral **b. check flooding** **c. rain irrigation** **d. free flood irrigation**

- rain irrigation

21. What types of cross drainage work provided when the canals Run below the drain with full supply level (FSL) of Canal below the bed of the drains ? [इन्जिनियरिङ सेवा, सिभिल समूह, पाँचौ तह 2078/11/28]

a. aqueduct **b. super passage** **c. level crossing** **d. siphon aqueduct**

- super passage

Superpassage

✓ A cross-drainage structure where a stream flows over a canal.

✓ The canal flows below with a free surface (gravity flow).

✓ Functions like a reverse aqueduct.

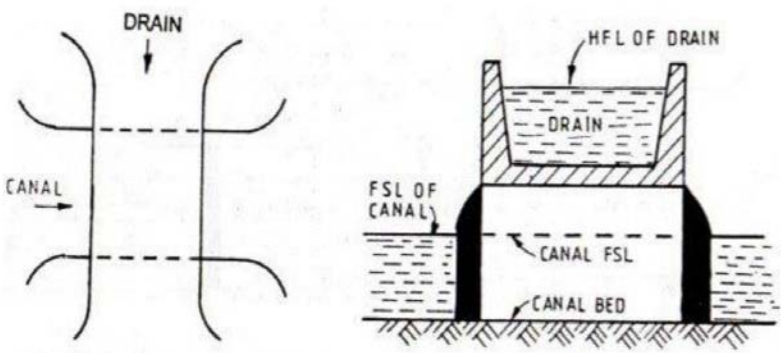
✓ Used when the canal's FSL is lower than the stream bed.

✓ Canal may be flumed for economy, but the stream trough is never flumed.

✓ Requires deep foundations and extensive training works.

✓ Maintenance is harder, often no inspection road, and a separate bridge is needed for roads.

✓ Structurally and hydraulically similar to an aqueduct, but considered inferior.



Drain taken over the canal in a Superpassage or in a Syphon. (Line Plan of Crossing)

Typical cross-section of a Superpassage.

22. Loss in Canal discharge occurs mainly due to..... [इन्जिनियरिङ सेवा, सिभिल समूह, पाँचौ तह 2078/11/28]

a. seepage and percolation **b. seepage and evaporation** **c. percolation and absorption** **d. seepage and absorption**

- seepage and evaporation

Explanation:

Major losses in canals are due to seepage and evaporation. Basically at initial stage, seepage loss is about 40% of total canal discharge and evaporation loss is (2 to 3)%

23. Crop water requirement is proportional to..... [इन्जिनियरिङ सेवा, सिभिल समूह, पाँचौ तह 2078/11/28 | 2075/01/22]

a. evapotranspiration **b. effective rainfall** **c. seepage of water** **d. all of the above**

- evapotranspiration

Explanation:

Evapotranspiration (ETc): Directly affects water need; based on crop factor (Kc) and ETo (evapotranspiration for a reference grass). More evapotranspiration means more crop water requirement.

Other Factors Affecting Crop Water Requirement

✓ Type of Crop: Different crops need different amounts of water (e.g., rice > wheat).

✓ Climate: Higher temp, sun, wind = more evapotranspiration = more water needed; rainfall reduces irrigation need.

✓ Growth Stage: Water demand changes with crop stages; highest during peak growth.

✓ Soil Type: Sandy or shallow soils need more frequent watering due to poor retention.

✓ Cultivation Method: Efficient methods can reduce water use.

✓ Effective Rain: More useful rainfall = less irrigation required.

✓ Base Period: Longer growing period = more water needed overall.

24. Which of the following spill way is least suitable for an earthen Dam ? [इन्जिनियरिङ सेवा, सिभिल समूह, पाँचौ तह 2078/11/28]

a. Ogee spillway **b. Chute spillway** **c. side channel spillway** **d. shaft spillway'**

- Ogee spillway

Explanation:

Least suitable for earthen and Rock-fill dam is the ogee spillway as these are over flown spillways that can't be constructed on the earthen dam as it will wash away soil and pose other problems.

Some more info:

✓ Ogee Spillway:

– Has an S-shaped (ogee) profile matching the lower nappe of a sharp-crested weir.

– Commonly used for concrete/masonry dams in broad valleys.

✓ Chute Spillway:

– Uses a steep open channel (chute) to carry overflow away.

– Located along a dam abutment or saddle; ideal for earth/rockfill dams.

✓ Side Channel Spillway:

– Weir runs parallel to the flow direction, beside the discharge channel.

– Good for narrow canyons and earth/rockfill dams.

✓ Shaft Spillway:

– Water flows into a vertical or sloped shaft after passing a horizontal crest.

– Used where space is limited; also known as a morning glory spillway.

25. In irrigation system a Hydraulic structure is designed to withstand..... [इन्जिनियरिङ सेवा, सिभिल समूह, चौथो तह 2078/12/26]

a. seepage **b. hydraulic jump** **c. hydraulic pressure** **d. all of the above**

- all of the above

Hydraulic structures are designed to withstand:

✓ Water-related forces (hydrostatic, uplift, wave, hydrodynamic, dynamic, and flow-related pressures).

✓ Forces from materials (silt, ice, earth pressure).

✓ Natural phenomena (wind, seismic forces).

✓ Structural loads (dead weight, live loads, impact loads).

✓ Failure modes (overturning, sliding, compression, tension, shear).

✓ Hydraulic phenomena (hydraulic jump, scour).

✓ Operational conditions (design discharge, flood conditions, cavitation, seepage).

✓ Foundation-related issues (settlement, liquefaction, bearing capacity).

Hydraulic Jump

✓ Sudden rise in water surface when supercritical flow changes to subcritical flow.

✓ Accompanied by turbulence and energy dissipation.

✓ Involves a change from high velocity, low depth to low velocity, high depth.

✓ Can be used to destroy kinetic energy.

Hydraulic Pressure

✓ Pressure exerted by a fluid (like water) on a surface.

✓ Creates uplift forces on hydraulic structures.

✓ Distribution depends on the hydraulic gradient.

✓ Considered in the design of floors and aprons of weirs and other structures.

Seepage

✓ Movement of water through permeable soil from areas of high hydraulic head to low hydraulic head.

✓ Can cause uplift pressures on hydraulic structures and lead to waterlogging.

✓ Depends on soil permeability and hydraulic gradient.

✓ Needs consideration in the design of hydraulic structures on permeable strata.