

Iqra National University
Department of Civil Engineering
ASSIGNMENT

Discipline: MS Civil Engineering
Course Title: Water Demand Supply and
Distribution

Course Code: CE- 562

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Q1

Answer

- Hydrologic cycle:

The Hydrologic cycle can be define as “the continues re-circulating of water of the earth transport of the earth, linking atmosphere, land and oceans.

This cycle involves: Evaporation, Transpiration, Condensation, Precipitation, and Runoff

The total amount of this cycle remains the same.

- Now-a-days there is general discussion that Hydrological Cycle has been disturbed. Is this a myth or reality? Briefly explain.

That is not right(myth);

The green planet had been created balanced as well as the water cycle.

To explain that:

Inflow:

- 1- Groundwater inflow from adjoining areas.
- 2- Import defined as water channeled into a given area.
- 3- Precipitation

Outflow:

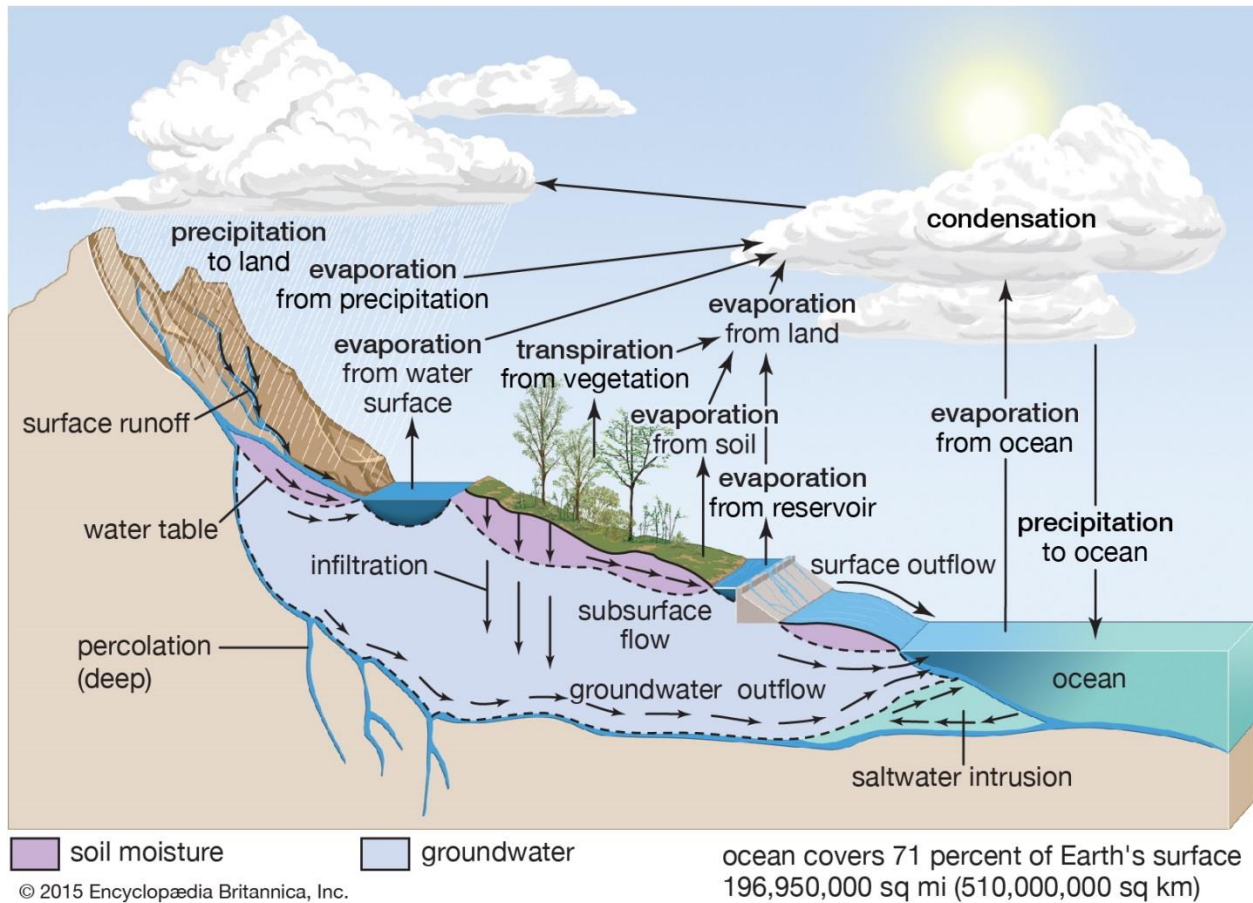
- 1- Evaporation
- 2- Transpiration
- 3- Surface runoff outflow
- 4- Export defined as water channeled out of the same area.
- 5- Interception.

Now change in the storage =outflow – inflow

The inflow = outflow and the change can be in:

Groundwater, Soil moisture, Surface reservoir water and depression storage, and Detention Storage.

There are some people consider that when their well water is reduced that can be the earth water is reduced, which it is not right because the water is transfer to different places and different formula in the earth not somewhere else.



(Fig 01 the water cycle)

Q2.

Answer

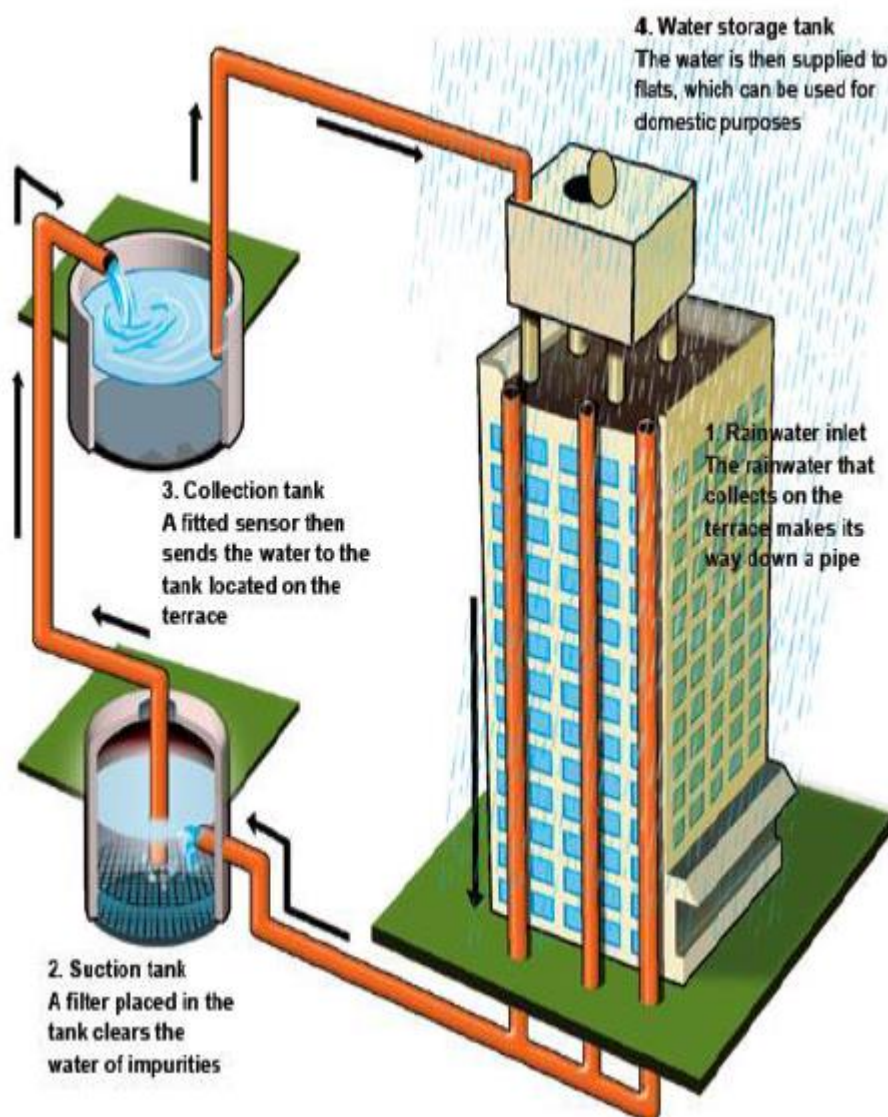
Briefly describe "Ground water Sustainability"?

- ✓ Groundwater sustainability can be defined "the development and use of ground water resources to meet current also future beneficial uses without causing undesired environmental or socioeconomic consequences.
- ✓ Groundwater sustainability is the development and use of groundwater to meet both current and future beneficial purposes without causing unacceptable consequences. It is important that we understand the factors that contribute to local, regional, or statewide groundwater shortages, the strategies that can be implemented to promote a sustainable groundwater supply, and what resources or tools are needed to implement these strategies successfully.

How can “**Rainwater Harvesting**” be linked to ground water sustainability?

First let’s define rain water harvesting

Rain water harvesting is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). One method of rainwater harvesting is rooftop harvesting. With rooftop harvesting, most any surface — tiles, metal sheets, plastics, but not grass or palm leaf — can be used to intercept the flow of rainwater and provide a household with high-quality drinking water and year-round storage. Other uses include water for gardens, livestock, and irrigation, etc (1)



The link can be summarized in the following points:

- 1) When we harvest the rain water we are feeding the groundwater and this is one of the purposes of harvesting.
- 2) It provides water when there is a drought, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable ground water levels to be sustained.
- 3) Can be used for Non-drinking purposes which will reduce the demand on GW.

Q3. What “Quality Parameters” should be considered in designing water supply system for a community?

There are many parameters will discuss them as following:

- ✓ General parameters:
 - ❖ It shall not contain disease-producing organisms.
 - ❖ It shall be colorless and clear.
 - ❖ It shall not have taste, free from odors.
 - ❖ It shall be non-corrosive.
 - ❖ It shall be plentiful and low in cost.
- ✓ It is that amount of water in Liters/day which a person uses daily on average. Its average value is 150-600 lpcd
- ✓ It is the average amount of water used by a person/ Community in one day divided by the number of people served. Water Supply Design

$$\text{Average Daily consumption (lpcd)} = \frac{\text{total water used in one year}}{(365 \text{ or } 366 \times \text{mid year population})}$$
- ✓ It is the maximum water consumption during any one day in the year. It is about 150 to 180 % of the avg. daily consumption.

$$\text{Maximum Daily consumption} = 1.5 \times \text{Avg. Daily}$$
- ✓ It is the peak consumption during any one hour of the years excluding the fire demand. The peak hourly consumption can be between 150 to 400 percent of the average hourly consumption during a peak day. It is around 150% of the maximum daily consumption. Water Supply Design

$$\text{Peak Hourly demand} = 1.5 \times \text{Max. Daily Demand} = 2.25 \times \text{Avg. Daily Demand}.$$
- ✓ Factors Affecting Water Consumption
 The various factors affecting the water consumption are given below
 - ❖ Climate
 - ❖ Standard of living
 - ❖ Extent of sewerage
 - ❖ Commercial or industrial activity

- ❖ Metering or cost of water
- ❖ Quality of water
- ❖ Availability of private sources
- ❖ Distribution system pressure
- ❖ Size of city
- ❖ Efficiency of the system
- ❖ Type of supply (continuous or intermittent)
- ❖ Level of service (Stand Post, Yard Connection, Full Plumbing)

✓ PIPES AND THEIR TYPES

Pipes are mainly differentiated on the basis of their material of construction. Different types of water supply pipes are available in the market. While selecting a particular type of pipe, following points must be considered. Water Supply Design

- ❖ Carrying Capacity
- ❖ Durability
- ❖ Purchasing Cost
- ❖ Maintenance Cost
- ❖ Type of water to be conveyed (Corrosive / Normal)

✓ Following are some major types of pipes commonly used in water supply system

- ❖ Cast Iron Pipes
- ❖ Steel Pipes
- ❖ Asbestos Cement Pipes
- ❖ PVC Pipes
- ❖ Galvanized Iron Pipes

(1) https://en.wikiversity.org/wiki/Rainwater_harvesting