

- : Mid Term :-
Exam :-

Paper :- WATER DEMAND SUPPLY & DISTRIBUTION

INSTRUCTOR :- NADEEM ULLAH. SIR.

NAME :- MUJAHID KHAN.

DISCIPLINE :- MS TRANSPORTATION ENGINEERING

REG NO :- 15274

COURSE CODE :- CE-562

- : IQRA NATIONAL UNIVERSITY :-

PESHAWAR

Question NO: 01

①

Ans:- Hydrological Cycle:-

The hydrological cycle is the descriptive term applied to the general circulation of water from the ocean to the atmosphere, to the ground, and back to the oceans.

Water is circulated on the planet earth mainly by solar & planetary forces.

or The earth's water circulatory system is known as hydrological cycle.

➔ It is true that hydrological cycle of the world has been disturbed, it is mainly due to human activities. The following are the some reasons of disturbance of hydrological cycle.

(i) Global Warming:-

It is now days, the most crucial issue of the world. It almost affect every department of the human life. But its effect on the hydrological cycle. On one side it causes melting of ice in glaciers which is the cause of heavy rainfall & on the other hand, it makes the lakes water contract. Due to global warming the evaporation of water from the earth surface increase. which cause heavy precipitation.

(ii) Construction of paved surfaces:-

It is also a huge factors now days that mostly the earth surface of earth is getting

② paved by concrete or asphalt. Due to this the overflow through surface increased and less absorption inside the earth surface which cause the high flow of rivers lakes etc & scarcity of water on land which decrease the rate of evaporation & p ununiform precipitation over area.

→ (iii) Geology:-

Due to rapid increase of urbanization the cities are being expanded to hilly areas, for this purpose the hilly areas are being excavated which make the surface ~~of rock~~ ^{of rock} exposed, permeable rocks allow for groundwater storage, percolation, base flow, through flow & infiltration. May reduce vegetation cover whilst adding impermeable concrete & tar some increase surface runoff can lead to higher river levels.

→ Pooled water leads to more evaporation.

→ (iv) Vegetation:-

Dense foliage increase interception to the precipitation to get the soil surface which make the hydrological cycle imbalanced. Roots suck up water which hardly reached to the soil surface. Reduce of overland flow causes fall in the flow near by streams.

→ (v) Irrigation:-

Modern ways of irrigation also causing disturbance of hydrological cycle.

1) ⇔ Taking of water from river or a ground water storage can reduced river flow

2) ⇔ Water in open storage increase evaporation

3) → Increase farming opportunities from irrigation of crops = more crops means more water removed from hydrological cycle. ③

→ (vi) Mining:-

- Removal of vegetation increase surface runoff
- Silting of lakes reduces storage capacity.

→ (vii) Dam Building & Reservoirs:-

- Increases water storage & reduces river levels.
- Increase evaporation which may affect local rainfall patterns.

→ (viii) Deforestation:-

- Can lead to extreme river flows due to increase in overland flow and a lack of interception.

→ Agriculture:-

- Compacted soil store water & reduce of infiltration.
- Removal of vegetation increase surface runoff.
- silting of lakes reduces storage capacity.



Question No:02

(4)

Ans:- :- GROUNDWATER SUSTAINABILITY:-

Groundwater sustainability is the development & use of groundwater resources to meet current & future beneficial uses without causing unacceptable environmental or socioeconomic consequences.

Explanation:-

Sustainability of Groundwater resources, seems to be commonly accepted that is development & use of groundwater resources to meet the current & future beneficial uses without causing unacceptable environmental or socioeconomic consequences.

Groundwater is critical component of the nation's water resource, Globally, groundwater resource is often dwarfed surface water supplies. But because groundwater is hidden, the resource is often forgotten or misunderstood. Groundwater is, in fact vital to public health the environment & the economy. Groundwater supply sustainable yield can be defined as how water can be withdrawn from an aquifer system, where & for how long with acceptable physical, economical, environmental, social, cultural, institutional & legal consequence. A sustainable supply of clean drinking water is crucial for world's future. Studies were ~~initiated~~ ^{initiated} to begin the answer the question of acceptable physical (hydraulic) & environmental limits to sustainability, while much has been accomplished, additional research need to be conducted to protect this vital resource.

Steps To Conserve The Groundwater Resources: (5)

- Compile a regional hydrogeological form work.
- Develop science plane for the comprehensive assessment of the plain & fractured rock aquifer.
- Construct an aquifer information system consisting of all major aquifers with plain.
- Evaluate & enhance monitoring-well networks
- Measure water-levels during the spring & fall for future use in regional groundwater-flow model.

Linking of Rain Water harvesting to ground water Sustainability:

Water is one of the essential requirement for existence of living beings. To fulfil this, surface & groundwater are two major source of water. Due to overpopulation & higher use of water in urban & also in rural area. The water supplying agencies are unable to copy up the demand from surface source like dam, reservoirs, rivers etc. However, the ~~form~~ ^{rainfall} occurrence in country depends upon the monsoon. which is limited to three to four months periods ranging around 20 to 30 days. Therefore to augment the natural supply of groundwater, the natural recharge to groundwater has become an important management strategy. This practice increase the sustainable of groundwater in the area where the groundwater level are declining & water scarcity is being experienced. ~~to~~
Rainwater harvesting is also necessary because

Because of following Reasons.

Agriculture continues to be single largest consumer of water from tankers. Tanker water is unreliable in quality & also very expensive rain water harvesting encourages groundwater sustainability & conservation of self-dependence & meet the domestic & other industrial needs. Demand on water resource is increasing day by day industrialization, urbanization & irrigated agriculture. Adopting the concept of global water shortage.

Rainwater harvesting system is one of the that can be implement to meet water storage problem. The quality & quantity of rain water collected is different from place to place depending on the weather condition, geographic location, activity in the area & storage tank.

Further more rainwater has a lot of potential as an alternative water resource for the future because of its high quality. Rainwater quality always exceeds the surface water & comparable to groundwater. In developed countries the government are building the civil structure to harvest the rainwater for domestic needs for agriculture, industrial etc.

In Pakistan a lot of water is wasted due to poor management, country are largely depend upon the groundwater to meet agricultural needs which cause shortage of groundwater & GWT fall.

Question No: 3.

7

Answer:- WATER QUALITY PARAMETERS:-

Water for human being comes from one of two Basic Sources.

①:- Water from well to supply an individual residence.

(2) Municipal water system that provide potable water to a wide array of Commercial property & domestic use Building etc.

The quality of water is based on three distinct characteristic. The characteristic are.

① Physical quality of water:-

The physical quality of water is the appearance of the water to the consumer. physical quality includes the clearness of the water, taste odor & temperature. For water to be attractive physical quality, it must be clear in appearance, or have low turbidity (less than 5.0 units of turbidity) Colure should be less than 15.0 unit of Colure

The water should be free from suspended substance that may produce taste & colour & odour.

The temperature of water also effect the attractiveness of the water, The temperature of ground water are 40 to 55 F° such temperature change with depth & above ground.

Storage facilities.

Surface water temperature 40 to 80 F° with even higher temperature.

(2) Bacterial quality of water:-

The most important quality of water is that of bacterial content. In the early 20th century, disease outbreaks from water & food-borne bacteria were common throughout the world. Progress in bacteriology & water treatment engineering has all but eliminated outbreak water-borne communicable diseases in US.

(3) Water Chemistry:-

Water is excellent solvent. so it is not surprising that it picks up other chemicals. During this cycles of water movement, water pick up many solid & gaseous component. As raindrops fall to the earth. They absorbed gases. Many & varied constituents are add to the water from dissolution of rocks & minerals which come in contact with the water & its movement.

Of particular importance to the water supplies are the following

- Acidity & Alkalinity
- Fluorides
- manganese
- Calcium
- Iron
- nitrogen compound.
- Chlorides.
- magnesium
- Silica

Many other that effect the water are:

- (i) Advective Transport
- (ii) Coliform Bacteria
- (iii) Pipe wall Reaction
- (iv) Biofilm
- (v) Lagosonum Approach
- (vi) Stand pipe
- (vii) water age.

