ASSIGNMENTS FOR MODULE ONE FOR WASH CERTIFICATE.

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**ANSWERS TO ASSIGNMENT QUESTIONS.**

**Q1. Explain why there is so much opposition to large dams.**

Answer:

Q1. Dams are built for several purposes not only for generation of electricity but also as a reservoir for water. However, despite the benefits of building dams are so many, there is still opposition to dams.

1. Dams are faced by lack of respect for free flowing rivers and healthy ecosystem.
2. Dams cause displacement of local citizens by the construction of the reservoir.
3. Dam’s workers are killed or injured during the construction.
4. Dams are characterised with a high environmental, economic and social cost during construction.
5. Dams are faced by brutal attempt to control nature with raw force.

**Q2. Briefly but in details explain benefits of large dams.**

Answer:

Dams are built for several purposes such as:

1. Water supply and irrigation. Dams gives access to water through two ways, one they simplify the process of capturing and delivering water from a river by creating impoundment from which draw water and by increasing the elevation of water so that it can be delivered more easily by gravity. Second dams capture water during wet periods and store it for delivering in dry periods. For example, Maasai herdsmen water their livestock at a village dam near Maasai Mara National Park, Kenya.
2. Flood control: Dams can capture large floods and use the water when it is a dry season or release the water slowly to reduce erosion. Narok County is within the rift valley which is flat and when they experience heavy rains, there are lots of floods. The water helps when it is a dry spell and by construction of large dams which stores water for livestock use in dry spells.
3. Hydro-power: The power of falling water can be used to run water mills or drive turbines that generate electricity.
4. Navigation: Dams converts flowing shallow water to still deep water which can allow ships and badges to move easily up and down the river systems.
5. Recreation: Secondary purpose for many large dams water based on the reservoir that develops behind dam
6. Fishing: Some reservoirs are used to capture fisheries or aquaculture.

**Q3. Other than the ways discussed above, briefly discuss any technologies through which people access water in cities and rural areas.**

**Answer:**

People access water in cities and rural areas through the following ways.

1. Dam’s construction: Dams capture water during wet periods and store it for delivering in dry periods.
2. Canals: when dams gives us ability to store water, conveyance canals along with pipes and tunnels provide with the ability to deliver water over a long distance to cities and farms to be used where there isn’t any natural source of water. An example that stands out is the Central Arizona Project (540km) which delivers water from Colorado river to Phoenix and Tucson and to farmers in Central Arizona.
3. Navigation canals on the other hand allows for inexpensive movement of people and goods over large distance. Whereas navigation on the rivers involves adjusting our mobility to the vagaries of natural river network, the construction of navigation canal allows for adjustment of water network to the transportation needs.
4. Wells and boreholes: Hand dug wells have been in use for as a way to obtain water, but the need to have the same and boreholes grew during 20th Century due to advances in drilling technology and availability of electric and diesel powered pumps. This has allowed for tapping of water in a way that was impossible before. Boreholes have brought life to places where we did not have any sign of life and has made life comfortable. With technology, boreholes are fixed with either electric or diesel pumps and the whole house can be supplied with clean water, the farm and for irrigation purposes.

**Q4. Is there a significant difference between water quality in shallow wells and boreholes? Justify your answer with a detail explanation.**

**Answer:**

The water quality in shallow wells and boreholes has no significant difference but water in shallow wells should be sunk sufficiently deep below the free standing surface of the ground water to provide adequate storage, to increase the infiltration capacity into the well, and to accommodate seasonal fluctuations in depth of water table. It is advisable to cover the bottom of the well with a gravel or stone layer to prevent silt from being stirred up as water percolates upwards, or as the water is distributed by bucket or pump used for abstraction. The well shaft should extend above the ground surface to prevent contaminated surface water from running down into the well. The well should be covered with a slab and equipped with a suitable pump or bucket and rising mechanism.

Water from boreholes is underground and of better quality in terms of bacteria and suspended solids, than surface sources and its supply is more reliable. For this reason human settlement have shown a preference for underground water for domestic supplies.

Once a borehole has been sunk to below the water table, tests should be carried out to estimate the safe yield from that borehole. The sustained yield of a borehole or well is the flow rate of water into the hole when the hole is pumped continuously for a period of 48 hours to cause maximum draw dawn. The safe yield is estimated at 30 to 50 % of the sustained yield.

Initially a step draw down test, and then a maximum drawn down or constant rate endurance test should be carried out to determine the maximum yield. The period of the test shall be determined by duty of the borehole in normal use.

**Q5. Explain the frequency of testing wells and what is your opinion if you found bacteria in your well?**

**Answer:**

Once wells have been dug below the water table, tests should be carried out to estimate the safe yield from that well. The sustained yield of a well is the flow rate of water into the hole when the hole is pumped continuously for a period of 48 hours to cause maximum drawn-dawn. The safe yield is estimated at 30 – 50% of the sustained yield. Initially a step drawn- dawn test, and then a maximum drawn-dawn or constant rate endurance test should be carried out to determine the maximum yield. The period of the test should be determined by the duty of the well in normal use. If bacteria are found in the wells, some forms of purification, disinfection and chlorination is necessary to kill the bacteria.

**Q6. Discuss any diseases related to mismanagement of water and how the same affects the economy of the country in question.**

**Answer:**

Diseases related to mismanagement of water can be by pathogens-diseases causing organism that includes bacteria, amoebas and virus as well as eggs and larvae of parasitic worms and diarrhoea. Money used to treat the diseases associated with levels of sanitation and clean water can be used to develop the economy hence affecting the economy of the country.

**Q7. Explain the sources of surface water and how the concerned authorities are safeguarding the same.**

**Answer:**

Surface water is bulk supplies of water drawn from rivers or surface reservoirs. The sources of surface water can be organised with use of rain water, groundwater, spring and service water.

Rain water: Rainfall water is a source of good quality water which can be collected and stored for domestic, agricultural and even industrial use. The harvesting of rainwater from the roof run off can supplement domestic supplies in semi-arid areas. Rain water harvesting at household level is done by storage of rainwater through roof catchments and at community level by storage through ground catchments.

Groundwater: Groundwater can be used as a catchment for harvesting rainwater for small communities. Part of the rainfall will serve to wet the ground or get lost due to evaporation or infiltration. The storage facilities for ground catchment rainwater harvesting can either be above ground or below ground.

Spring: Spring water emerges from the ground. Before using a spring thorough sanitary survey needs to be carried out at the site to assess the quantity and quality of water and the possible contamination.

To safeguard the water sources, the water authority may take control or manage the catchment from which the water runs off. This pollution control should fall within the water authority in the catchment to ensure good quality portable water and to safeguard the run off volume. Catchment management may extend to control of abstractions from streams or ground. Treatment of surface water is confined to removal of suspended solids, followed by disinfection. Sedimentation and filtration are dominant purifiers by the concerned authority to safeguard surface water.

Springs should be protected from flooding and surface water pollution by constructing a deep diversion ditch above and around the spring. The ditch should be constructed so it collects surface water running towards the spring and carries or diverts it away.

**Q8. Explain the characteristics of good rainwater harvesting system.**

**Answer:**

Rainwater is a source of good quality water which can be collected and stored for domestic, agricultural and industrial use. The characteristics of good rainwater harvesting system depend on the following.

* The size of storage tank available to store and collect water effectively.
* The roof catchment to collect water.
* The attached gutter and down pipes to the storage tank.
* Available rain water for collection and storage.

**Q9. What steps should the state or the water management authorities put in place to promote use of and harvesting of rainwater.**

**Answer:**

The steps to be put in place by water management authority or the state to promote use of rainwater is to sensitize the community on how to clean their storage tanks when it rains for the first time after period of drought.

The inlet to the storage tank should be protected with gauze screen to keep out leaves, dirt, mosquitoes and other rodents from getting access to the tank.

Some form of purification and disinfection is necessary especially if the rainwater is stored for a long time.

**Q10. What is your take on recycling used water and the repugnancy associated with it?**

**Answer:**

Recycling used water is an appropriate way of conserving water resources as well as containing polluted water from contaminating other available clean water sources. Though the idea of drinking water that someone else has already used is repugnant to most people, water reuse does not mean reusing only for drinking purposes. The water needs of society for other needs such as industrial and irrigation purposes do not require water of the same quality as that needed for drinking.

By using water several times societies can get more production and hence conserves water resources by taking measures to improve the quality of water that have already been rendered useless due to pollution, the source can be reclaimed to supplement the available freshwater.