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Subject: Water Demond Supply and Distrubation.

Q1:. Ans:. Desalination:.

It is the process of removing waste from water in the form salt and other minerals from the saline to make it suitable for drinking, irregation or for industrial purpases is called or know as Desalination.

⇒ Various Desalination Methods:.
The following are various types or methods for Desalination.

1) Distillation OR Evaporation
2) Electro dialysis
3) Freezing
4) Reverse osmosis

1) Distillation:.

In this method the salt water is heated in one container to make the water evaporate, leaving the salt behind.
The desalinated vapor is then condensed to form water in a separate container.

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Although long know, it has found limited application in water supply because of the fuel costs involved in converting salt water to vapor form is very high.

2) Electrodialysis:

In this type of method electrodialysis utilizes a membrane and sends an electric charge through the solution. Furthermore it draw metal ions to the positive plate on one side and other ions (like salt) to the negative plate on the other side.

3) Freezing Method:

This method is based on the principle that water exclude salts when it crystallizes to ice. It involves three steps (ice formation ice washing, and ice melting) to obtain fresh water with subsequent removal of contaminants.

4) Reverse osmosis (RO)

In this type of method water purification technology is used that uses a semi-permeable membrane to remove ions molecules and larger particle from saline water.

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Reverse osmosis can remove many types of dissolved and suspended species from water, including bacteria, and is used in both industrial processes and also in the production of potable or drinking water.

It is significantly decrease the salts and other potential impurities in the water, resulting in a high quality and great tasting water.

⇒ Forther more this method involved 5(five) steps to complete this method.

⇒ 1st Step:-

→ Removal of sediments from the water in this step all the sediments like clay silt and stones are removed from the water.

→ For this process we used 5 micron filter. The sediments are filtered in order to make sure that no damage is done to the membrane.

→ The micron filter does not let these particle pass by and thus they are suspended.

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→ 2nd Step:

→ In this step carbon filter is used to remove the chlorine and other harmful chemicals that enter to the water.

→ These chemicals are harmful to human health and thus it is necessary to remove them.

→ 3rd Step:

The 3rd step focuses on passing the water from a dense and compacted carbon filter. Most of the contaminates are removed here.

→ 4th Step: water passes through the membrane and all the heavy metal present in the water are removed.

→ Along with the metals radioactive metal too are removed. In this step the impurities are drained out of the reverse osmosis system and clean water is separated.

→ 5th Step:

In this last stage the bacteria chlorine and bad odour are removed from water. After water passes from this stage it comes out of the faucet and is perfect

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for Consumption
→ This step involves tertiary treatment or polishing.

=> More Effective Method:

The more effective method among all the methods of Desalination is Reverse osmosis because this is the latest technology for using the purification of water

=> Further more we briefly define above this type of method with full detial.

END

Q2 Ans:

Merits and Demerits of 4 types of water Distribution methods:

First of all we have 4 types so water distribution layout which following

1) Dead End system
2) Radial system
3) Grird Iron system
4) Ring system.

Now we drictly define the merit and the demrit of

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all of this types one by one.

1) Dead END System:

⇒ Merit:

→ This is Relatively cheap.
→ Determination of discharges and pressure easier due to less number of values.

⇒ Demerit:

Due to many dead ends, stagnation of water occurs in pipes.

2) Radial System:

Merit:

→ It is quick system or service
→ Stagnation does not occure.
→ The water is easily distributed to every conection at a time.

⇒ De Merit:

→ The only de merit of this is low pressure because there are many conection at time which they give water so because of the pressure is also distributed.

3) Grid IRon System:

⇒ Merit:→ water is kept in

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Good Circulation due to absence of dead ends
→ In the cases of breakdown in some section, water is available from some other direction.

→ DeMerit:
→ Proper designing is Relatively difficult

4) Ring System:
Merit:
→ water

can be supplied to any point from at least two directions.

The above is the merit and demerit of all of four type of water distribuation layout in detial.

⇒ I personly recomended "Radial water distribuation system" if we have enough budget with this we will high velocity and high Pressure head loss as minimum and quick discharge it is most sutible for newely proposed township in hilly area.

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Q3 Ans:

Different type of Reservoirs:

Depending upon their elevation w.r.t ground it may be classified into the following two types.

1) Surface Storage/reservoirs
2) Elevated reservoirs

1) Surface reservoirs:

This type are also know as ground reservior. mostly circular or Rectangular tank. Under ground reservoirs are pefferred especially when the size is large. In case of gravity system underground reservoirs are generally constructed on high natural ground and are usually made of stones bricks, plain or reinforced cement concrete.

The side walls are designed to take up the pressure of the water, when the reservoir is full and the earth pressure when it is empty. To obtain water tightness bitumen compounds are used at all construction joints.

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2) Elevated Storage Reservoirs:

Elevated storage reservoirs also refferred to as overhead tank are required at distribution area which are not governed and controlled by the gravity system of distribution.

→ This are rectangular or Circular in shape

→ If the topography of the town is not sutible for gravity system, the elevated tank or reservoir are used to provide sufficient pressure head.

→ The total storage capacity of a distribution reservoir is the summation of

→ 1) Balancing storage
→ 2) Break down storage
→ 3) Fire storage.

⇒ The total reservoir storage can finally be worked out by adding all the three storage and calculated by the following

$Q_f = 65\sqrt{P}(1 - 0.1\sqrt{P})$

→ Q_F = Fire demand l/s P = population in thousnd

$Q_f = 53\sqrt{P}$ Q_f = Fire Demand
P = population in thousnd

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$Q_f = 320 \times C\sqrt{A}$

Q_f = fire Demond
A = Area of all stories of the building under consideration (in^2)
C = constant depending on the type of construction.

F N D

Q4 Ans:

The primary objective of pumping system is to
1) Transfer liquid source to destination
2) Circulat liquid around system.

pump are used for transfering the water from Storage or Resivoir to the usable water area like over head tank etc. To reach the water to over head tank by pump and then we easly used it in our daily For Example use in homes in baths and in kitches etc. The main purpase of using pump in water supply Schem is the moves water

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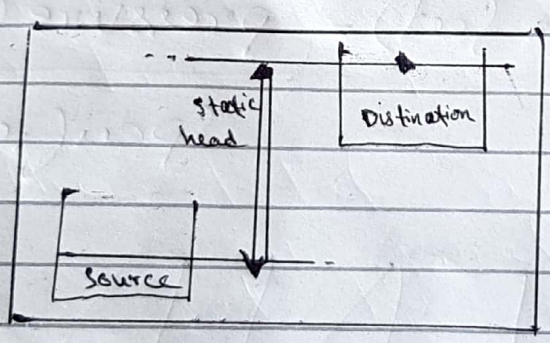
from one place to another with full pressure which is producing by this pump in the water supply schem.

⇒ how To calculate pump curve to meet water demand:

To calculate the pump curve by two method.

1) Static Head
2) Friction head

1) Static Head
   -> verticle distance b/w the source and destination
   -> It is indepdent of flow condation



2) Frication Head
   -> Resistance to flow in pipe and fittings.
   -> Depends on size, pipe fittings, flow rate nature of liquid
   -> closed loop system only

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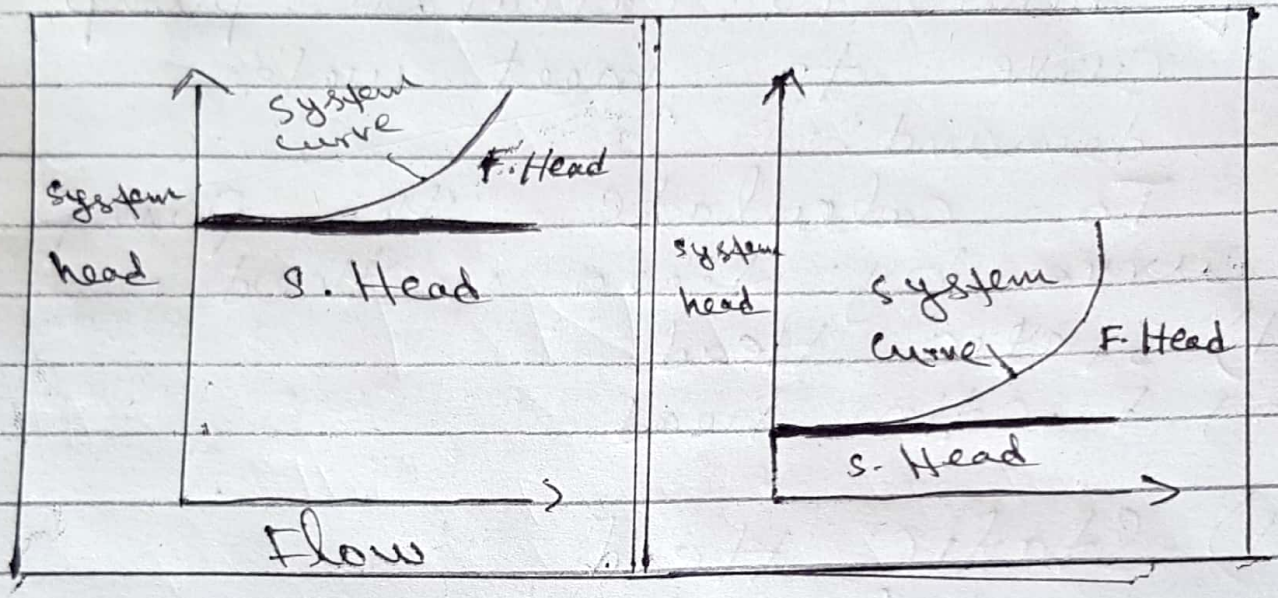
has friction head
⇒ (no static head)

⇒ System head is the sum of static head and friction head



Static Head at any Pressure is given as

$$\text{Head (in feet)} = \frac{\text{pressure (psi)} \times 2.31}{\text{Specific Gravity.}}$$

END