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Assignment Applied chemistary

Q1/ in karachi there is shortage of drinking water through they have plenty of sea water. which method do you suggest to them to converting sea water into drinking water and explain the method?

Ans/ suggest method of solar power Solar Powered desalination unit. device that transforms salt water into drinking water by converting the sun's energy to head directly or indirectly, to drive the desalination process. Solar desalination mimics earth's natural water cycle (the process that generates rainfall) and has been practiced by humans as a rudimentary water-treatment process since the time of the ancient Greeks.

The design of a direct, or passive, unit, generically called a solar still. can be quite simple and inexpensive. The salt water in the desalination unit is heated by the sun, converting the liquid to water vapour. As it is heated, the water vapour rises to the top of the unit, collects on the inside lid, and condenses back to liquid as fresh water

in a separate collection container.
The salt cannot change to a gas and
therefore, remains in the original unit.
Direct solar desalination works well
for purification but, because of
the low operating temperature of
the unit does not produce alot
of water per day. The amount
of drinking water produced in a direct
desalination unit is proportional
to the surface area of the device.
The daily freshwater output per
square metre of area is typically 2 to
3 litres (about 0.5 to 0.8 gallon), depending
on the solar still design. The typically
easy to operate design, however,
make ideal for small scale needs of
families in remote area, since the
average person need about two litres
of water per day to survive. The process
is driven solely by solar energy, so
weather conditions and variable solar
intensity (due to the shifting position
of the sun throughout the day) can
negatively impact efficiency
the output from a direct solar
desalination unit is to low to be
employed in a commerical operation.
Therefore indirect solar desalination
method must be utilized to increase
freshwater production. indirect solar
desalination combines two different

technologies. Solar energy collection (through the use of photovoltaic panels) is coupled with a proven desalination method such as multistage flash distillation. multiple effect evaporation or reverse osmosis employing renewable solar energy as a supplemental heat source can help to eliminate energy consumption of fossil fuels, significantly reducing operating costs and making commercial desalination plants viable.

Q3| a | write the different between electronic and electrolytic Conductors.

Ans| Electronic Conductors

(i) flow of electricity take place without the decomposition of substance.

(ii) Conduction is due to the flow of electron.

(iii) Conduction decreases with increase in temperature.

(iv) An electronic conductor is an object or type of material which permits the flow of electric charges in one or more direction. for example a wire is an electronic conductor that can carry electricity along its length.

electronic conductors in general transport electronic charges from one point in a circuit to another.

Electrolytic Conductors:

(i) flow of electricity take place by the decomposition of the substance.

(ii) flow of electricity is due to the movement of ions.

(iii) Conduction increases with increase in temperature.

(iv) electrolytic Conductor the electric charge are transported by free moving ions through a fluid. There are some hybrid conductors such as silver sulfide through about 80% of the current is conducted electrolytically and remainder electronic.

(b) Define the following

(i) Specific conductance:

Specific Conductance is the ability of a substance to conduct electricity. it is the reciprocal of specific resistance conductance mean the flow of current through the liquid conductor. Specific Conductance is define as conducting capacity of a solution of the dissolved electrolyte and the whole solution is being placed between two electrodes are 1 Sq. cm and length 1cm.

. it is denoted by k (kappa)
. it is the reciprocal of resistivity (ρ).
. it is also know as conductivity
. ohm's Law states that the resistance of any substance is directly proportional to its length and inversely proportion to its area. so, ohm's law can be expressed as follows specific resistance of a conductor can be defined as the resistance of the conductor having a length of 1 cm and a cross-section area of 1 cm2.

(ii) Molar Conductance:
Molar conductivity is the conductance property of a solution containing one mole of the electrolyte or it is a function of the ionic strength of a solution or the concentration of salt. It is therfore not a constant.
OR
Molar when one mole of an electrolyte is dissolved in a solution the ions produce in the solution are capable of conducting electricity. Molar conductance is define as the conducting power of the dissolved ions produced in the solution. Molar conductance is denoted by

λ (lambda) and its unit is given by S $cm^2 \cdot mol^{-1}$

(iii) Equivalent Conductance (Λ_e)

- it is defined as the Conductance (or conducting power) of all the ions (of a solution) produce by dissolving one gram equivalent of an electrolyte in a particular solution.
- we can say that the conductance of an electrolytic solution depends on the concentration of the ions present in the solution.
- it is helpful to get comparable result for different electrolytes.
- Denoted by Λ_e.
- Equivalent Conductance (Λ_e) is calculated from specific conductance.

02| which type of problem are expected by using untreated water in boiler? How can you prevent them?

Problems that arise in boiler:

There are several problem within a boiler system which require chemical treatment or other mechanical means to treat them.

The major problems are:

- Scale
- Corrosion
- Boiler water Carryover
- Sludge Deposition

The can cause psoblem in all
pasts of the system starting
with the feed tank leading
through the boiler then to the
condensate system. The problem
arise from the quality of the
water used within the steam
raising system and the way
in which the system is operated
in the industusy. In extreme cases,
steam boilers can explode
causing much damage and even
death. So for this reason that
strict standards have arisen
on how to treat and
maintain boilers and associated
systems.

Common Boiler Problems.
Poor water Treatment
Prevention of Scaling:
The need for proper feedwater
treatment is obvious for prevention
of scaling or buildup if you will
consider the comprision of an industrial
or commercial boiler and a pot
of boiling water on the salve.
The boiler is actually an oversized
distillery in that the water
entering the boiler is vaporized
to steam leaving the solid
behind. Depending on the amount

of solid in the water or hardness, the residue in some time visible when a pot containing water is boiled until all the water is vaporized prevention of corrosion:

The most effective method of controlling corrosion with in the boiler is proper deaeration of the water. The removal of oxygen from the water drastically reduces the potential for corrosion. This is most often accomplished through the use of deaerators. These unit typically utilized steam to both preheat the feedwater and remove the oxygen carbon dioxide, and other gases from the make up water. oxygen scavenging chemical are also commonly injected into the deaerator to provide and additional measure of protection. Additionally boiler steam down, or feed water, has generally supplied chemical at a controlled rate for even further protection.

Q1/ How can you say that your domestic water sample contains hardness and suggest any one method for estimation of hardness of water.

Ans/ Suggest the EDTA Titration

- permanent hardness is usually determined by titrating it with a standard solution of ethylenediaminetetraacetic acid, EDTA.
- The EDTA is a complexing or chelating agent used to capture the metal ions. This causes the water to become softened, but the metal ions are not removed from the water.
- This method includes a series of titrations to determine the total, permanent, temporary, Ca, Mg hardness of the given water sample.
- First the EDTA soln. is standardized by titrating it against a standard $CaCl_2$ solution and its normality is found out. End point is appearance of steel blue color.
- Then the total hardness is found out by titrating the water sample (added buffer soln and EBT indicator) against the standardized EDTA solution with end point as the same steel blue colour.

Hardness = $N \times 50 \times 1000$ (N - Normality)

- The permanent hardness is found out by titrating a boiled and filtered hard water sample against EDTA solution.
- Temporary hardness is found by subtracting the permanent hardness from the total hardness.
- The Ca hardness is found by titrating the water sample (added 2N NaOH, murexide indicator) against EDTA solution. Here the end point is the appearance of purple color. if necessary the Mg hardness is found by subtracting the Ca hardness from total hardness.