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Fill in the blanks

(a) Most liquids that conduct electricity are solutions of ________, ________, and ________.
(b) The passage of an electric current through a solution causes ________ effects.
(c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the ________ terminal of the battery.
(d) The process of depositing a layer of any desired metal on another material by means of electricity is called ________.

Solution

(a) Most liquids that conduct electricity are solutions of acids, bases and salts.
(The solutions of acids, bases or salts are conducting in nature. They allow the current to pass through.)

(b) The passage of an electric current through a solution causes chemical effects.
(When an electric current passes through a solution, the solution decomposes into its positive and negative ions)

c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the negative terminal of the battery.
(When current is passed through a copper sulphate solution, the solution decomposes into positively charged and negatively charged ions. These positively charged ions get attracted towards the negative plate)

(d) The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating.
(Electroplating is the deposition of metal on other material)

#463017

When the free ends of a tester are dipped into a solution, the magnetic needle shows deflection. Can you explain the reason?

Solution

The deflection occurs because the circuit becomes complete since free ends of the tester are dipped in a solution. The solution is certainly a conducting solution. This is the reason why the compass needle shows a deflection.

#463019

Name three liquids, which when tested in the manner shown in Figure, may cause the magnetic needle to deflect.

Solution

Liquids like lemon juice, salt water, vegetable oil allow electricity to pass through them. Therefore, these liquids can be used as in the beaker to show the given effect.

#463020

The bulb does not glow in the setup shown in the given figure. List the possible reasons. Explain your answer.

Solution
The bulb may not glow because of the following reasons:

(i) Liquid in the beaker is do not conduct electricity. In such case, the electric current would not be able to pass through the liquid. Hence, the circuit is not complete.

(ii) Electric current in the circuit is very weak. This can happen if the material used for making the circuit is non-conducting or the battery does not have sufficient energy to generate electricity.

A tester is used to check the conduction of electricity through two liquids, labeled $A$ and $B$. It is found that the bulb of the tester glows brightly for liquid $A$ while it glows very dimly for liquid $B$. You would conclude that:

A $A$ is a better conductor than liquid $B$

B $B$ is a better conductor than liquid $A$

C both liquids are equally conducting

D conducting properties of liquid cannot be compared in this manner

Solution

The amount of current flowing through a conducting solution depends on the conductivity of the solution. More the conductivity, more current passes through the solution and vice-versa. Hence, the conductivity of liquid $A$ is more than the conductivity of liquid $B$.

Does pure water conduct electricity? If not, what can we do to make it conducting?

Solution

No, pure water does not conduct electricity. This is because pure water do not contain any salts. Pure water can conduct electricity when common salt is added to it, as salt solution is conducting in nature.

In case of a fire, before the fireman use the water hoses, they shut off the main electrical supply for the area. Explain why they do this.

Solution

Water is a good conductor of electricity. So, if the electrical supply for the area is not shut off and water is spread over electrical appliances, then electricity may pass through water and harm the firemen. Therefore, in case of a fire, the firemen shut off the main electrical supply for the area before they use the water hoses.

A child staying in a coastal region tests the drinking water and also the seawater with his tester. He finds that the compass needle deflects more in the case of seawater. Can you explain the reason?

Solution

Sea water contains more dissolved salts than the drinking water. Therefore, it is more conducting than the drinking water. Due to this reason, the compass needle deflects more in seawater than in the drinking water.

Is it safe for the electrician to carry out electrical repairs outdoors during heavy downpour? Explain.

Solution

No, it is not safe to repair electrical appliances outdoors during heavy downpour because rain water contains dissolved salts. It can conduct electricity. The electrician can get electric shock while working outside in rain.

Panelli had heard that rainwater is as good as distilled water. So she collected some rainwater in a clean glass tumbler and tested it using a tester. To her surprise she found that the compass needle showed deflection. What could be the reason?

Solution
Rain water contains dissolved salts which makes it a conducting solution. There are no dissolved salts present in distilled water. Hence, rainwater allows electricity to pass through it, while distilled water cannot.

### #463029

Prepare a list of objects around you that are electroplated.

#### Solution

Examples of electroplated objects are as follows:

(i) Chromium plating (different parts of cars, buses and motor cycles to give them shiny appearance)

(ii) Gold-plated ornaments.

(iii) Iron coated with a layer of zinc. This protects iron from corrosion and rusting.

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### #463031

The process that you see is used for purification of copper. A thin plate of pure copper and a thick rod of impure copper are used as electrodes. Copper from impure rod is sought to be transferred to the thin copper plate. Which electrode should be attached to the positive terminal of battery and why?

#### Solution

Copper ion is positively charged, that is why it gets attracted towards the plate which is connected to the negative terminal of the battery. As copper ions are transferred to the thin copper plate, the thin pure copper plate must be connected to the negative terminal of the battery. Therefore, the impure copper rod is connected to the positive terminal of the battery.