Acid Test Chemistry Questions with Solutions

Q-1: How can natural indicators be used to determine whether a substance is acidic?

Answer: A natural indicator is one that is derived from natural resources such as plants. The colour may or may not change when such indicators are mixed with the substances. The colour change predicts whether the substance is acidic or not.

For example: A China rose indicator is a light pink-colored solution. Its colour changes from light pink to magenta (deep pink), indicating that the solution is acidic.

Q-2: When an acid test is performed on the mineral magnesite, which gas is released?

a) Hydrogen
b) Carbon Dioxide
c) Oxygen
d) Carbon monoxide

Answer: b) carbon dioxide

Explanation: Magnesite is a mineral with chemical formula $MgCO_3$. When acid test is performed the following reaction takes place:

$MgCO_3 + 2HCl \rightarrow CO_2 + H_2O + MgCl_2$

Q-3: A cold acid test of dolomite is

a) Weak
b) Strong
c) Very weak
d) No reaction

Answer: a) weak

Explanation: Dolomite ($CaMg(CO_3)_2$) is a carbonate mineral. When one drop of cold hydrochloric acid is placed on a piece of dolomite, the reaction is weak or non-existent. Instead of a visible fizz, you will notice a drop of acid on the surface of the mineral, possibly with a few bubbles of carbon dioxide gas slowly growing on the surface of dolomite.

Q-4: Which of the following carbonate minerals gives a strong warm acid test?

a) Magnesite
b) Azurite
c) Siderite
d) Witherite

Answer: b) Azurite

Explanation: The mineral azurite has the chemical formula $Cu_3(CO_3)_2(OH)_2$.
When warm acid is applied to azurite, the entire drop erupts with bubbles and a vigorous fizz lasts for a few seconds. This happens because at higher temperatures, the acid and rock react more vigorously.

Q-5: What can be done if a specific mineral gives a weak acid test?

Answer: Hydrochloric acid has different effects on different carbonate minerals. With a mineral with a weak acid test, you must be observant and patient. In order to obtain a visible reaction, always powder a small amount of mineral on a streak plate and place a drop of acid on it. This results in an increase in surface area, which allows the acid to access more minerals and the reaction occurs.

Q-6: What colour changes occur when red cabbage juice is subjected to an acid test?

a) Bluish green
b) Red
c) Blue
d) Purple

Answer: b) Red

Explanation: The juice of red cabbage is a dark reddish-purple solution. It can be used as a natural indicator. An acid test on red cabbage juice causes the colour to change to red.

Q-7: The stone used for acid scratch test for precious metals is

a) Egg stone
b) Ruby stone
c) Kasauti stone
d) Sunstone

Answer: c) Kasauti stone

Explanation: A Kasauti is a small piece of black stone used by goldsmiths during acid scratch tests to check the quality of gold/silver(precious metals).

Q-8: Do non metals give a positive acid test?

Answer: No,nonmetals do not react with acids because when a substance reacts with acids, it provides electrons to the H^+ ions produced by the acids. Non-metals are electron acceptors and thus cannot donate electrons.

Q-9: What precautions should be taken when performing an acid test?

Answer: Concentrated acids are highly corrosive to all body tissues, particularly the eyes and skin. Acids are extremely toxic due to their high corrosiveness. Acids, on the other hand, need not be feared if handled safely and with the proper equipment.

Hence, it is recommended to wear protective gloves, glasses, paper towels, and have immediate access to an eyewash station when dealing with acids. It is also necessary to always use acid-compatible containers such as PVC,LDPE etc. for their storage.

Q-10: Which of the following specimens has a strong reaction to acid?

a) Coquina
b) Oolite
c) Rhodochrosite
d) None of the above

Answer: a) and b)

Explanation: A few rocks can cause drastic reactions with hydrochloric acid. These are usually calcite or aragonite rocks with a lot of pore space or a lot of surface area. Some examples include chalk, oolite,coquina, and tufa. When a drop of dilute hydrochloric acid is applied to these specimens, an eruption of acid foam can arise and spread to an unexpected diameter.

Q-11: The compound formed by dissolving elemental gold in aqua regia during acid test is

a) AuCl
b) $AuNO_3$
c) $H[AuCl_4]$
d) $H[Au(O_3)_4]$

Answer: c) $H[AuCl_4]$

Explanation: Aqua regia is made by mixing three parts concentrated HCl and one part concentrated HNO_3.It is used to dissolve noble metals like gold and platinum.

The reaction of gold with aqua regia is shown below:

$Au + 4H^+ + NO_3^- + 4Cl^- \rightarrow AuCl_4^- + NO + 2H_2O$

Q-12: Can we add water to acid?

Answer: No, it is not recommended to add water to acid.

Explanation: When diluting an acid, it is preferable to add the acid to water rather than the water to the acid. Because adding water to a concentrated acid generates a lot of heat, it can result in an explosion and acid burns on your skin, clothing, and other body parts.
As a result, mixing acid with water is safe, but mixing acid with water is not.

Q-13: How litmus paper is used to measure the acidity of a solution?

Answer: A paper that changes colour in response to the acidity of the solution in which it is dipped is litmus paper. Hence can be used to measure acidity.

When blue litmus paper is dipped in an acid solution, it turns red, but red litmus paper remains unaffected.In this way, one can check the acidity of the solution.

Q-14: The chemical formula of fluoroantimonic acid is

a) $SbHF_6$
b) $SbHF_5$
c) SbF_6
d) Sb_2HF_6

Answer: a) $SbHF_6$

Q-15: How is the chromic acid test performed?

Answer: It is performed by taking three drops of the test compound and mixing it with five drops of acetone and five drops of chromic acid solution (an orange solution).

A positive test is indicated by the disappearance of the red-orange colour of chromic acid and the formation of a blue-green colour of the Cr (III) ion.

Practise Questions on Acid Test

Q-1: How can the presence of CO_2 gas be confirmed?

Answer: The most effective method for detecting CO_2 is to pass the gas through lime water which is a diluted solution of calcium hydroxide (slaked lime). When carbon dioxide is bubbled through a solution, a solid precipitate of calcium carbonate forms. In water, calcium carbonate is insoluble.

The following reaction takes place:

$Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3\ (s) + H_2O\ (l)$

Q-2: If the fizz of CO_2 takes place when acid is poured on rocks and minerals, it indicates

a) Presence of sulphide minerals
b) Presence of carbonate minerals
c) Presence of silicate minerals
d) Presence of oxide minerals

Answer: b) Presence of carbonate minerals

Explanation: Applying a drop of dilute (5 percent to 10%) hydrochloric acid to a rock or mineral and watching for bubbles of gas to form is referred to as acid test. The bubbles of CO_2 indicate the presence of carbonate minerals.

Q-3: How is the acid scratch test for gold carried out?

Answer: Any gold-colored item rubbing on a black stone(kasuti stone) leaves a visible mark, which is tested by applying nitric acid (aqua fortis), which dissolves the mark of all gold coloured items except gold. The remaining mark dissolves when tested with 1:3 nitric acid and hydrochloric acid solution (aqua regia) indicating genuine gold.

Q-4: Which gas is formed when a metal is subjected to an acid test?

a) Chlorine gas
b) Hydrogen gas
c) Both of the above
d) No evolution of gas

Answer: b) Hydrogen gas

Explanation: The following is the general equation for the reaction of metal with acid:

Metal + Acid → Metal chloride + Hydrogen gas

Metal can be any active metal like sodium, potassium, calcium, lithium etc.

Q-5: Which instrument is typically used when the fizz of the gas obtained after an acid test is weak?

a) Streak plate
b) Hand lens
c) Watch glass
d) Microscope

Answer: b) Hand lens

Explanation: A hand lens is one of the most fundamental tools of a field geologist.Geologists in the field, lab, or office must frequently examine rocks, sediments, soils, sand, minerals, and other materials with minute details. A hand lens allows the geologist to complete that task quickly and easily.

Hence during an acid test the bubbling release of a gas can be so weak that a hand lens is required to observe single bubbles slowly growing in a drop of hydrochloric acid.