

Chemistry Practical Class 12 Determination of Anions in a Given Salt Viva Questions with Answers

Anions:- $(\text{CO}_3)^{2-}$, S^{2-} , $(\text{SO}_3)^{2-}$, $(\text{SO}_4)^{2-}$, $(\text{NO}_2)^-$, $(\text{SO}_4)^{2-}$, Cl^- , Br^- , I^- , PO_4^{3-} , $(\text{C}_2\text{O}_4)^{2-}$, CH_3COO^- , NO_3^-

Q1. What is a radical?

Answer. A radical is an atom or group of atoms that carries charge and behaves as if it were a single unit in chemical reactions.

Q2. What are acidic and basic radicals?

Answer. Acidic radicals are negatively charged anions. For example, SO_4^{2-} , NO_3^- , and so on. Positively charged cations are basic radicals. For example, Na^+ , Fe^{2+} , and so on.

Q3. Explain the value of preliminary tests in qualitative analysis.

Answer. Preliminary tests can sometimes provide accurate information about an ion in salt. The presence of sodium, for example, is indicated by a golden yellow colour in a flame test. Brown residue in a charcoal cavity test indicates the presence of cadmium in salt, and so on.

Q4. Name the anions detected with the help of dilute H_2SO_4 ?

Answer. CO_3^{2-} , S^{2-} , SO_3^{2-} , NO_2^- .

Q5. Why is dilute H_2SO_4 preferred over dilute HCl while testing anions?

Answer. When the salt is treated with HCl , HCl gas is produced along with the salt gas during the reaction. As a result, the actual gas cannot be identified, whereas H_2SO_4 does not have this problem.

Q6. Why does a lead-containing salt turn black after a long period of time in a laboratory?

Answer. Due to the formation of black lead sulphide in the atmosphere as a result of H_2S action

Q7. Name the anions detected by conc. H_2SO_4 .

Answer. Cl^- , Br^- , I^- , NO_3^- , CH_3COO^- .

Q8. Name the radicals which are confirmed with the help of sodium carbonate extract.

Answer. S , Cl^- , Br^- , I^- , PO_4^{3-} , SO_3^{2-} , SO_4^{2-} .

Q9. How is sodium carbonate extract prepared?

Answer. The salt is combined with double the amount of solid Na_2CO_3 and approximately 20 ml of distilled water. It is then boiled until it is reduced to one-third of its original volume and filtered. The filtrate is either sodium carbonate extract or a mixture of the two (S.E.).

Q10. What is water extract?

Answer. The given salt or mixture is thoroughly shaken with distilled water before being filtered. The filtrate is either the water extract or a mixture of the two (W.E.).

Q11. What is lime water and what happens on passing carbon dioxide gas through it?

Answer. Lime water is a solution of $\text{Ca}(\text{OH})_2$ in water. Carbon dioxide reacts with limewater (a calcium hydroxide solution, $\text{Ca}(\text{OH})_2$) to form a white precipitate (a milky precipitate) of calcium carbonate, CaCO_3 .

Q12. Carbon dioxide gas and sulphur dioxide gas both turn lime water milky. How will you distinguish between the two?

Answer. Both the solution will be passed through a solution of acidified $\text{K}_2\text{Cr}_2\text{O}_7$. SO_2 causes $\text{K}_2\text{Cr}_2\text{O}_7$ to turn green, whereas CO_2 has no effect.

Q13. How will you test the presence of carbonate ions?

Answer. Using dil. H_2SO_4 , treat a small portion of the mixture. CO_2 gas is produced. The gas becomes milky after passing through lime water.

Q14. CO_2 and Br_2 are both brown in colour. How are you going to tell them apart?

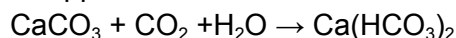
Answer. On passing both the solutions through a FeSO_4 filter. CO_2 darkens FeSO_4 solution whereas Br_2 has no effect.

Q15. What is lime water?

Answer. Lime water is a solution of $\text{Ca}(\text{OH})_2$ in water.

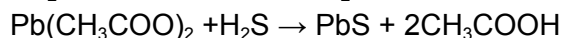
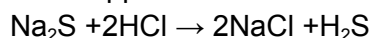
Q16. What happens if too much CO_2 is passed through lime water?

Answer. Because the white ppt. of CaCO_3 dissolves into soluble calcium bicarbonate, the milkiness disappears.



Q17. How do you test for sulphide?

Answer. Warm the salt with a small amount of H_2SO_4 . H_2S gas is formed. It blackens paper that has been dipped in lead acetate.



Q18. Is there another gas besides CO_2 that causes lime water to turn milky?

Answer. It is, indeed, SO_2 gas.

Q19. On heating with a cone, all nitrates are released. In the presence of a paper pallet, H_2SO_4 produces NO_2 gas.

Answer. HNO_3 is reduced to NO_2 by using a carbon-based paper pallet.

Q20. How will you determine whether the solution in the bottle is lime water?

Answer. Fill a test tube with 2 ml of the solution and blow into it with a glass tubing. The presence of milkiness indicates that the solution is lime water.

Q21. How is the ring test for nitrates carried out?

Answer. Freshly prepared ferrous sulphate solution is added to the salt solution, followed by concentrated sulphuric acid along the tube walls. At the intersection of the two solutions, a dark brown ring forms.

Q22. What is the composition of the dark brown ring which is formed at the junction of two layers in the ring test for nitrates?

Answer. A brown ring is typically formed at the interface of sulphuric acid and ferrous sulphate. This ring indicates that nitrates are present in the given solution. The brown ring test, also known as the nitrate test, is a reduction reaction. Ferrous (II) reduces the nitrate to nitric oxide, which is then oxidised to ferrous (III).

Q23. In the ring test for nitrates, why does a dark brown ring form at the junction of two layers?

Answer. Since H_2SO_4 is heavier and reacts with a small amount of nitrate and FeSO_4 at its surface, a brown ring appears only at the junction of the two layers.

Q24. What is the chromyl chloride test?

Answer. Heat a small portion of the mixture with a cone. In a dry test tube, combine H_2SO_4 and solid $\text{K}_2\text{Cr}_2\text{O}_7$. Chromyl chloride vapours of a deep brownish-red colour are formed. Pass these vapours through the water. H_2CrO_4 yellow solution is formed. When NaOH, acetic acid, and lead acetate are added to this solution, a yellow ppt. confirms the presence of chloride in the mixture.

Q25. What is the chemistry behind the carbon disulphide test for bromide or iodide?

Answer. Add dil. HCl to a portion of the soda extract. Now, add a small amount of CS_2 and an excess of chlorine water to this and thoroughly shake the solution. Chlorine removes bromine or iodine from bromide or iodide, which then dissolves in carbon disulphide to produce orange or violet colouration.

Q26. Why do bromides and iodides not give tests similar to chromyl chloride tests?

Answer. Since chromyl bromide (CrO_2Br_2) and chromyl iodide (CrO_2I_2) compounds are not formed, bromine and iodine are evolved in their place.

Q27. Describe the layer test for bromide and iodide ions.

Answer. The Layer's test is performed in the presence of 'dilute hydrochloric acid' and 'carbon disulphide.' In the presence of bromide ions, this results in an orange layer, whereas in the presence of iodide ions, a violet layer forms. The layer's test is used to confirm the presence of halogens in a mixture.

Q28. Why is silver nitrate solution stored in dark coloured bottles?

Answer. Silver nitrate decomposes when exposed to sunlight; therefore, silver nitrate is stored in brown bottles to prevent decomposition. Brown bottles cut the passage of light through them.

Q29. How do you test the presence of sulphide ions?

Answer. The reaction of hydrogen sulphide gas with warm dilute H_2SO_4 a sulphide produces hydrogen sulphide gas, which smells like rotten eggs. When exposed to the gas, a piece of filter paper dipped in lead acetate solution turns black due to the formation of lead sulphide, which is black in colour.

Q30. Why does iodine give a blue colour with the starch solution?

Answer. The blue colour is caused by iodine's physical adsorption on starch.