

H₂SO₄, SO₂ and H₂S: Important Questions

Question 1. What do you observe when : barium chloride solution is added to a dilute sulphuric acid.

Question 2. Give equation for the following conversions

- i. Sulphur dioxide to sulphur
- ii. Sulphur dioxide to sodium sulphite
- iii. Sodium sulphite to sulphur dioxide.

Question 3. Give one similarity and two differences between bleaching action of SO₂ gas and chlorine gas.

Question 4. Write the equation for the laboratory preparation of sulphur dioxide from sodium sulphite. [ii] How is the SO₂ collected? [iii] What does the method of collection tell you about the density of SO₂? [iv] What do you see when SO₂ is bubbled through an acidified K₂C₂O₇ solution?

Question 5. Write one equation in each case to show the action of sulphur dioxide as :

- i. A reducing agent;
- ii. An oxidizing agent;
- iii. An acid anhydride.

Question 6. What is the similarity in the use of sulphur dioxide and chlorine as bleaching agents.

Question 7. Write correctly balanced equation for the following reaction – Iron and dilute sulphuric acid.

Question 8. Name the oxide of sulphur that reacts with water to give sulphuric acid.

Question 9. In the Contact Process, the direct reaction between oxide of sulphur and water is avoided. In this process, what does the oxide of sulphur react with instead of water and what is the name of the product?

Question 10. Write correctly balanced equation for the reaction of dilute sulphuric acid with each of the following:

- i. Copper carbonate
- ii. Lead nitrate solution
- iii. Zinc hydroxide

Question 11. Supply the word [or words] that will make the sentence into a correct statement and rewrite the sentence.

[i] Copper sulphate crystals are dehydrated by sulphuric acid.

Question 12. Write a balanced equation for the reaction between zinc and dilute sulphuric acid.

Question 13. When burning sulphur [i.e. SO₂] reacts with H₂O , a compound is formed. Name the compound.

Question 14. Give the balanced equation for reaction between SO₂ and moist Cl₂.

Question 15. What is the purpose of the Contact Process? Name the catalyst used in the Contact Process. Write the balanced equation for the reaction in the process that takes place in the presence of the catalyst.

Question 16. When H_2S reacts with oxidizing agents, what substance is always a product of the reaction.

Question 17. State the colour of the precipitate formed when H_2S is bubbled through copper sulphate solution.

Question 18. What do you see when concentrated sulphuric acid is added to copper sulphate-5-water?

Question 19. Write a balanced equation for: SO_2 and sodium hydroxide solution. [Formation of normal salt].

Question 20. State how you can obtain: H_2S from iron (II) sulphide.

Question 21. Name one catalyst, used industrially, which speeds up the conversion of SO_2 to SO_3 in the production of sulphuric acid in the laboratory or industrially. Write the equation for the conversion of sulphur dioxide to sulphur trioxide. Why does this reaction supply energy? What is the name of the compound formed between SO_3 and sulphuric acid?

Question 22. Write the balanced equations for dilute HCl and sodium sulphite.

Question 23. Write equations for: [i] Dil H_2SO_4 – producing H_2 , [ii] Between $\text{Pb}(\text{NO}_3)_2$ solution. & dil. H_2SO_4 .

Question 24. Explain a reagent chosen from: ammonium hydroxide, barium chloride, sodium hydroxide, sulphuric acid and nitric acid enables to distinguish between the two acids mentioned therein.

Question 25. From the following gases: ammonia, chlorine, hydrogen chloride, sulphur dioxide, select the gas that matches the description given below and answer the questions that follow : Gas A is a reducing agent which contains oxygen. [i] What is the name of gas A? [ii] What would you observe if gas A is bubbled through acidified potassium dichromate solution?

Question 26. State the substance/s reacted with dilute or concentrated sulphuric acid to form the following gases : [i] Hydrogen [ii] Carbon dioxide. State whether the acid used in each case is dilute or concentrated.

Question 27. Write the equations for the laboratory preparation of : [i] Sodium sulphate using dilute sulphuric acid. [ii] Lead sulphate using dilute sulphuric acid.

Question 28. Name a gas that smells of rotten eggs.

Question 29. Write the observations and balanced equations for the reaction: A paper dipped in potassium permanganate solution is put on the mouth of a test-tube containing sulphur dioxide gas.

Question 30 State the name of the process by which H_2SO_4 is manufactured. Name the catalyst used.

Question 31. “Concentrated sulphuric acid is used in the laboratory preparation of nitric acid and hydrochloric acid because it is _____ [less volatile/stronger] in comparison to these two acids.”

Question 32. Write the equations for the laboratory preparation of the following salts using sulphuric acid:

- i. Copper sulphate from copper
- ii. Lead sulphate from lead nitrate.

Question 33. From the gases ammonia, hydrogen chloride, hydrogen sulphide, sulphur dioxide – Select the following:

- i. This gas can be oxidized to sulphur.
- ii. This gas decolourises potassium permanganate solution.
- iii. This gas can be obtained by the reaction between copper and concentrated sulphuric acid.

Question 34. Name the catalyst that helps in the conversion of sulphur dioxide to sulphur trioxide.

Question 35. In the Contact process for the manufacture of sulphuric acid, sulphur trioxide is not converted to sulphuric acid by reacting it with water. Instead a two-step procedure is used. Write the equations for the two steps involved.

Question 36. What type of substance will liberate sulphur dioxide from sodium sulphite.

Question 37. Write the equation for the reaction by which sulphur dioxide is converted to sodium sulphite.

Question 38. The bleaching action of Cl_2 is permanent whereas the bleaching action of SO_2 is temporary.

- i. Give the reason why chlorine is not used to bleach silk.
- ii. State the similarity in the use of sulphur dioxide and chlorine as bleaching agents.
- iii. Explain the bleaching action of sulphur dioxide with the help of chemical equation.

iv Why is bleaching by sulphur dioxide only temporary.

Question 39. Write balanced equations for the following reactions:

- i. Potassium hydrogen carbonates and dilute sulphuric acid.
- ii. Sodium nitrate and concentrated sulphuric acid.

Question 40. Choose the properties of sulphuric acid (A, B, C and D), which is relevant to each of the preparations [i] to [iii]:

A: Dil. acid (typical acid properties), B: Non-volatile acid, C: Oxidising agent, D: Dehydrating agent

- i. Preparation of hydrogen chloride.
- ii. Preparation of ethane from ethanol.
- iii. Preparation of copper sulphate from copper oxide.

Question 41. What is observed when hydrogen sulphide gas is passed through lead acetate solution?

Question 42. Select the correct compound from the list given – Ammonia, Copper oxide, Copper sulphate, Hydrogen chloride, Hydrogen sulphide, Lead bromide – which matches the description given below : This compound smells of rotten eggs.

Question 43. State what is observed when sulphur dioxide is passed through a jar containing bromine water.

Question 44. Name the process used for the large-scale manufacture of sulphuric acid.

Question 45. Which property of sulphuric acid accounts for its use as a dehydrating agent.

Question 46. Concentrated sulphuric acid is both an oxidizing agent and a non-volatile acid. Write one equation each to illustrate the above-mentioned properties of sulphuric acid.

Question 47. Give a reason why sulphur dioxide is used as anti-chlorine.

Question 48. Write balanced equation for the following reactions:

- i. Lead sulphate from lead nitrate solution and dilute sulphuric acid.
- ii. Copper sulphate from copper and concentrated sulphuric acid.
- iii. Ammonium sulphate from ammonia and dilute sulphuric acid.

Question 49. Some properties of Sulphuric acid are listed below. Choose the property A, B, C or D, which is responsible for the reactions (i) to (v). Some properties may be repeated:

A. Acid; B. Dehydrating agent; C. Non-volatile acid; D. Oxidizing agent.

- i. $C_{12}H_{22}O_{11} + nH_2SO_4 \rightarrow 12C + 11H_2O + nH_2SO_4$
- ii. $S + 2H_2SO_4 \rightarrow 3SO_2 + 2H_2O$
- iii. $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$
- iv. $CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$
- v. $Na_2CO_3 + H_2SO_4 \rightarrow Na_2SO_4 + H_2O + CO_2$

Question 50. i Name the acid formed when sulphur dioxide dissolves in water.

ii Name the gas released when sodium carbonate is added to a solution of sulphur dioxide.

iii What are the two necessary conditions for the direct combination of sulphur dioxide and chlorine forming sulphuryl chloride ?

iv State the property of sulphur dioxide which causes potassium permanganate to change its colour from purple to colourless.

Question 51. HCl, HNO₃ and H₂SO₄ are the formulae of three compounds. Which of these compounds has the highest boiling point and which has the lowest.

Question 52. Dilute hydrochloric acid and dilute sulphuric acid are both colourless solutions. How will the addition of barium chloride solution help to distinguish between the two