

### 1. How dense is ammonia compared to air?

#### Solution:

Ammonia has less density when compared to air.

### 2. What does the Fountain Experiment demonstrate?

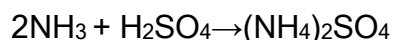
#### Solution:

The Fountain Experiment demonstrates that ammonia gas possesses high solubility in water.

### 3. What is the balanced equation for the reaction that occurs between sulphuric acid and ammonia?

#### Solution:

The balanced equation for the above reaction is as follows:



### 4. Pick the odd ones out - Sulphur dioxide, carbon dioxide, hydrogen chloride, ammonia

#### Solution:

Ammonia is the odd one out as it is basic.

### 5. Gas 'Z' gives off dense white fumes when it reacts with chlorine. Its aqueous solution exhibits a blue colour with copper (II) hydroxide.

#### 1. What is gas 'Z'?

#### 2. State 'Z's' formula.

#### Solution:

1. Z is ammonia.
2. The formula for ammonia is  $\text{NH}_3$

### 6. State few applications of ammonia.

#### Solution:

Ammonia has many applications:

1. Ammonia is used primarily as a fertilizer
2. Ammonia is also used as a refrigerant gas
3. Used in the production of explosives and plastics
4. It is used in the production of household cleaning solutions and industrial-strength cleaning solutions.
5. Ammonia also has applications as a pesticide
6. Ammonia is also used in the manufacture of sodium carbonate by the Solvay process.

### 7. What happens when ammonium hydroxide is added to the aqueous solution of Zinc nitrate?

#### Solution:

When this reaction occurs, a gelatinous white precipitate of zinc hydroxide is formed. It is soluble in ammonium hydroxide.

**Reaction:**  $\text{Zn}(\text{NO}_3)_2 + 2\text{NH}_4\text{OH} \rightarrow 2\text{NH}_4 + \text{NO}_3 + \text{Zn}(\text{OH})_2$

**8. What happens when ammonium hydroxide is added to the aqueous solution of Iron(II) sulfate?**

**Solution:**

A green-ish precipitate of ferrous hydroxide is formed. It is insoluble in excess of ammonium hydroxide.

**Reaction:**  $\text{FeSO}_4 + 2\text{NH}_4\text{OH} \rightarrow [\text{NH}_4]_2\text{SO}_4 + \text{Fe}(\text{OH})_2$

**9. How do you distinguish between ferric salt and ferrous salt through a chemical test?**

**Solution:**

Using a dropper, ammonium hydroxide can be added to two test tubes containing the salts:

- The test tube with ferrous salt will result in a dull-green precipitate.
- The test tube with a ferric salt will result in a reddish-brown precipitate of its hydroxides.

**10. Name the following:**

1. What is the gas created by Haber's process?
2. The two gases, when combined with ammonia, gives dense, white fumes.

**Solution:**

1. Ammonia
2. Chlorine and hydrogen chloride

**11. Which salts of ammonia are used in the following:**

1. Medicine
2. Explosives
3. Dry cell

**Solution:**

1. Ammonium carbonate
2. Ammonium nitrate
3. Ammonium chloride

**12. Name the acidic gas that reacts with a basic gas, resulting in the formation of neutral gas.**

**Solution:**

Hydrogen chloride

When hydrogen chloride reacts with a basic gas such as ammonia, ammonium chloride is formed - which is a neutral gas.

**13. Answer the following:**

1. Name the metallic chloride which is soluble in ammonium hydroxide.
2. Name the gas formed when ammonia is burnt in an atmosphere containing oxygen (no catalyst present)

**Solution:**

1. Silver chloride
2. Nitrogen

**14. What is the salt produced by the reaction of basic gas and an acid gas?**

**Solution:**

Ammonium chloride is the salt produced by the reaction of a basic gas and an acid gas.

**15. Ammonia is produced when sodium hydroxide solution is used to warm ammonium salt. State the ways to identify ammonia gas.**

**Solution:**

- Ammonia has a distinct pungent odour.
- Ammonia turns a moist yellow litmus paper brown, a moist red litmus paper blue, and phenolphthalein solution pink.

**16. What is an alternative to chlorofluorocarbons?**

**Solution:**

A suitable alternative to chlorofluorocarbon is ammonia in liquid form. It is also environmentally friendly and does not cause any of the global repercussions as chlorofluorocarbons.

17.

**(a) Why are ammonium ions formed when ammonia is dissolved in water?**

**(b) Name the other ion formed when ammonia is dissolved in water.**

**Solution:**

- (a) Ammonia ions are formed due to the basic nature of ammonia molecules.
- (b) Hydroxyl ions are also formed alongside ammonia ions.

**18. Why is ammonia a suitable refrigerant?**

**Solution:**

Ammonia's pressure is low enough to produce the temperatures needed for refrigeration. It also carries more heat per kg than other traditional refrigerants. Moreover, it is also non-corrosive to metals used in the construction of fridges and other pieces of equipment used for refrigeration.

**19. What type of displacement method is used to collect ammonia?**

**Solution:**

Since ammonia is lighter than air, downward displacement of air is used to collect ammonia. Moreover, ammonia cannot be collected using water because it is highly soluble in water.

**20. Name the resultant gases when the following compounds are heated:**

1. Ammonium chloride & Calcium hydroxide
2. Ammonium chloride & Sodium nitrite

**Solution:**

1. Ammonia
2. Nitrogen