



Answer all the questions below then check your answers

1. What is a base?
2. Name 3 common types of bases.
 - a. What base is used in the indigestion tablet opposite?
3. What is the difference between a base and an alkali?
4. Complete the equation below (assume the base dissolves):



base + water →

5. Transition metal oxides and hydroxides are insoluble in water. So cannot be used to form alkaline solutions. However they are good bases and will neutralise acids. Complete the equation below:

Acid + base →

6. Complete the following equations which show acid base neutralization reactions:

i Copper oxide + sulfuric acid \longrightarrow

ii lead oxide + hydrochloric acid \longrightarrow

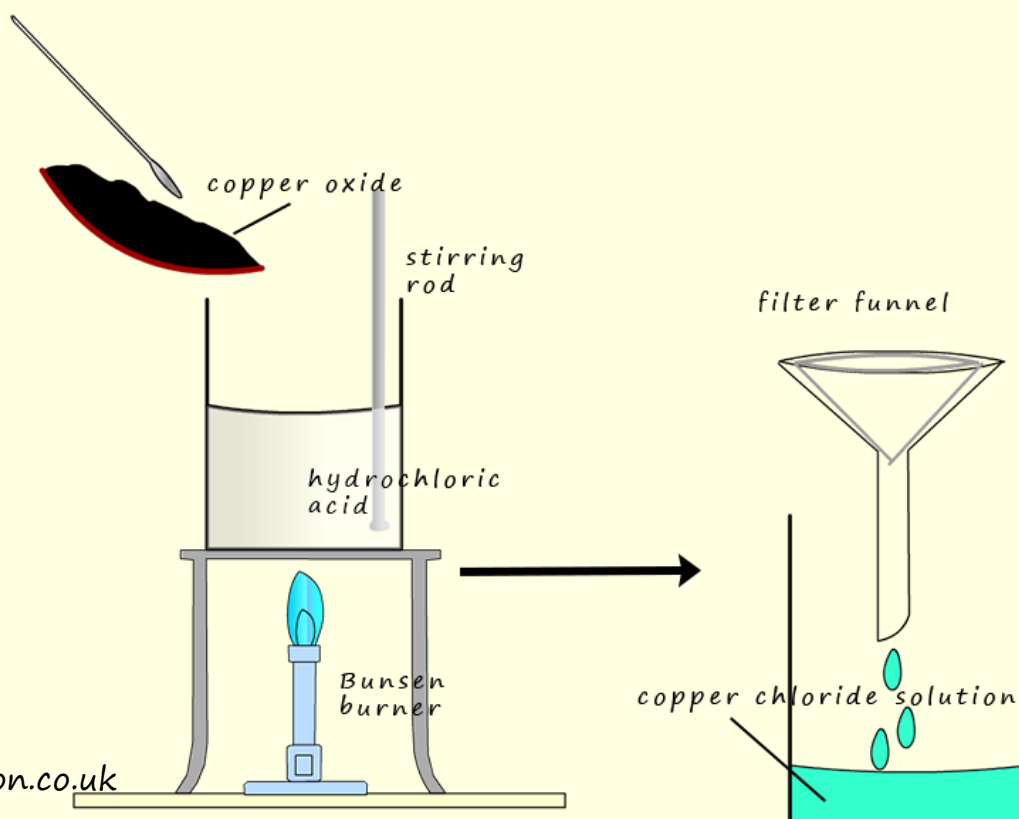
iii iron oxide + nitric acid \longrightarrow

7. The salt produced depends on the acid used. Complete the table below.

acid	Salt produced
Hydrochloric	
Nitric	
sulfuric	

8. Why can you not use copper oxide to make an alkaline solution?

a. The base copper oxide can be used to neutralise hydrochloric acid as shown below.



- a. The copper oxide is insoluble in water but it dissolves in acid. How can this fact be used to help you decide when the neutralisation reaction taking place in the diagram has finished?
- b. An excess of copper oxide is added to the acid. What does an excess mean? Why is the copper oxide used in excess?
- c. Why is the acid heated and stirred well?
- d. Complete the equation below for the neutralisation reaction:

Copper oxide + hydrochloric acid →
- e. Why is the neutralised solution filtered?
- f. How could solid copper chloride be obtained from the copper chloride solution?

Answers

1. What is a base?

A substance that will neutralise an acid to produce salt and water.

2. Name 3 common types of bases.

Metal oxides, metal carbonates, metal hydroxides (solids not solutions)

a. What bases is used in the indigestion table opposite? *Calcium carbonate*

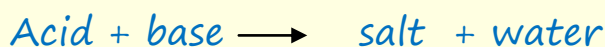
3. What is the difference between a base and an alkali? *Alkalis are solutions with an excess of hydroxide ions, bases are mostly solids.*

4. Complete the equation below (assume the base dissolves):

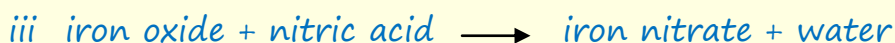
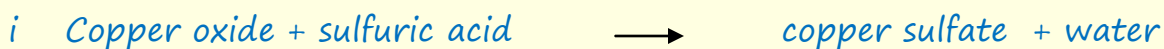


5. Transition metal oxides and hydroxides are insoluble in water. So cannot be used to form alkaline solutions. However they are good bases and will neutralise acids.

Complete the equation below:



6. Complete the following equations which show acid base neutralization reactions:



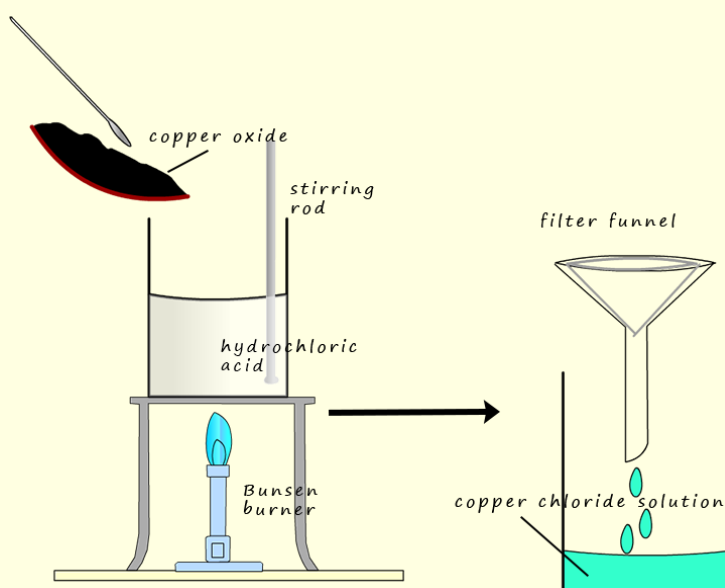
7. The salt produced depends on the acid used. Complete the table below.

acid	Salt produced
Hydrochloric	Chloride
Nitric	Nitrate
sulfuric	sulfate

Neutralising acids using insoluble bases:

8. Why can you not use copper oxide to make an alkaline solution? *It's insoluble in water.*

a. The base copper oxide can be used to neutralise hydrochloric acid as shown below.



a. The copper oxide is insoluble in water but it dissolves in acid. How can this fact be used to help you decide when the reaction taking place in the diagram has finished? *When you first add the copper oxide and stir it will dissolve in the hot acid. When all the acid has been neutralised and only water is left the copper oxide will no longer*

dissolve. So when the copper oxide is left on the bottom of the beaker you know the acid has been neutralised.

- b. An excess of copper oxide is added to the acid. What does an excess mean? Why is the copper oxide used in excess? *Excess means too much, you add too much copper oxide to make sure all the acid is neutralised.*
- c. Why is the acid heated and stirred well? *To speed up the reaction.*
- d. Complete the equation below for the neutralisation reaction:

Copper oxide + hydrochloric acid \longrightarrow copper chloride + water

- e. Why is the neutralised solution filtered? *To remove excess insoluble copper oxide*
- f. How could solid copper chloride be obtained from the copper chloride solution?

Evaporate off the water – put solution in an evaporating basin and heat with a Bunsen burner.