

Workbook Questions

11 Making salts

11.1 Making salts – acids and metals

- 1 Dasbala
- 2a chloride
b nitric
c sulfate
- 3 A, D, F, B, E, C
- 4a zinc chloride
b magnesium sulfate
c magnesium chloride
d iron sulfate
- 5 Place a lit splint inside a container with the gas. If the splint goes out and a squeaky pop sound is made, the gas was hydrogen.

11.2 Making salts – acids and carbonates

- 1 See the table at the bottom of the page.
- 2a copper chloride
b carbon dioxide
- 3a copper carbonate + hydrochloric acid → **copper chloride + carbon dioxide + water**
b zinc carbonate + sulfuric acid → **zinc sulfate + carbon dioxide + water**
c magnesium carbonate + **nitric acid** → magnesium nitrate + **carbon dioxide + water**
d **copper carbonate** + sulfuric acid → copper sulfate + carbon dioxide + **water**
- 4a The carbonate will stop bubbling.
b B, E, F
c E, F

11.3 Making salts – acids and alkalis

- 1a Sodium chloride
b Sodium nitrate
c Potassium sulfate
d Potassium chloride
- 2a hydrochloric acid + sodium hydroxide → **sodium chloride + water**
b **nitric acid** + sodium hydroxide → sodium nitrate + **water**
c nitric acid + potassium hydroxide → **potassium nitrate + water**
d hydrochloric acid + **potassium chloride** → potassium chloride + **water**

- 3a i Use a **measuring cylinder** to accurately measure 25.00 cm³ of sodium carbonate solution.
ii Place this solution in a **conical flask**. Add a few drops of Universal indicator solution.
iii Add hydrochloric acid to the sodium carbonate solution and indicator. Stop adding when the mixture is **green**.
iv Add charcoal powder to the mixture. Filter the mixture. Keep the **colourless** solution.
v Pour the solution into an **evaporating basin**.
vi Heat the solution until **half the solution has evaporated**. **Place the evaporating basin in a warm place for several days for the remaining water to evaporate.**
- b So he can determine when the sodium carbonate has been neutralized.
- c To remove the charcoal powder (which has removed the colour).

	copper carbonate	magnesium carbonate	zinc carbonate
hydrochloric acid	<i>copper chloride</i>	<i>magnesium chloride</i>	<i>zinc chloride</i>
nitric acid	<i>copper nitrate</i>	magnesium nitrate	<i>zinc nitrate</i>
sulfuric acid	<i>copper sulfate</i>	<i>magnesium sulfate</i>	<i>zinc sulfate</i>

Textbook Questions

11.5 Review

- 1 A compound made when a metal replaces the hydrogen in an acid.
- 2a magnesium sulfate
- b zinc chloride
- c magnesium nitrate
- d copper chloride
- e zinc sulfate
- f copper nitrate
- 3a Collect the hydrogen gas, place a lit splint inside. If the splint makes a squeaky 'pop' and goes out, the gas is hydrogen.
- b bubbles forming
- 4a magnesium nitrate + hydrogen
- b zinc sulfate + hydrogen
- c magnesium chloride + hydrogen
- d copper chloride + carbon dioxide + water
- e zinc nitrate + water
- 5a sulfuric acid
- b i copper sulfate + carbon dioxide + water
- ii copper carbonate + sulfuric acid → copper sulfate + carbon dioxide + water
- iii copper sulfate + water
- iv copper oxide + sulfuric acid → copper sulfate + water
- c i copper sulfate, water, copper oxide
- ii filtration
- d Transfer the solution into the evaporating dish. Using the beaker set up a water bath with the evaporating dish on top. Gently heat the beaker, evaporating the water in the evaporating dish, leaving copper sulfate crystals behind.

- 6a i carbon dioxide
- ii copper carbonate + hydrochloric acid → copper chloride + carbon dioxide + water
- b A, D, F, B, E, C, G, H
- 7a zinc + hydrochloric acid → zinc chloride + hydrogen

- c Heating the evaporating dish over a water bath heats the zinc chloride more evenly and gently, reducing spitting and reducing the loss of zinc chloride.