

N5 Chemistry
Unit 3: Chemistry in Society
Homework 3.5

Name _____

Teacher _____

1. Which of the following compounds is a salt?

- A Calcium chloride
- B Iron oxide
- C Hydrogen chloride
- D Sodium hydroxide

Answer _____

2. Which of the following hydrocarbons could be cyclohexane?

Hydrocarbon	Molecular formula	Observations on adding bromine solution
A	C_6H_{14}	no colour change
B	C_6H_{12}	rapid decolourisation
C	C_6H_{12}	no colour change
D	C_6H_{10}	rapid decolourisation

Answer _____

3. When a compound is burned completely, the products are carbon dioxide and water.

From this information, it can be concluded that the compound must contain

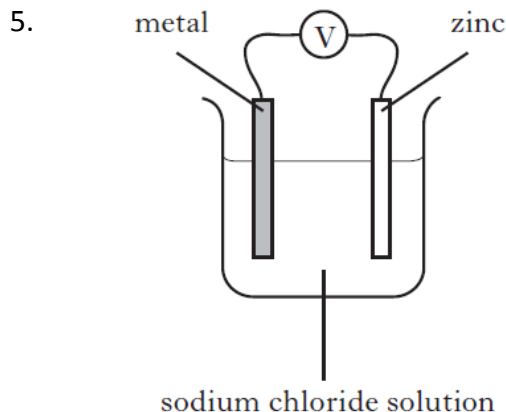
- A carbon only
- B hydrogen only
- C carbon and hydrogen
- D carbon, hydrogen and oxygen.

Answer _____

4. In an exothermic reaction

- A there is no energy change
- B energy is released to the surroundings
- C energy is absorbed from the surroundings
- D the energy of the products is greater than the energy of the reactants.

Answer _____



Which of the following metals, when linked to zinc, would give the highest cell voltage?

(You may wish to use the data booklet to help you.)

- A Copper
- B Iron
- C Magnesium
- D Tin

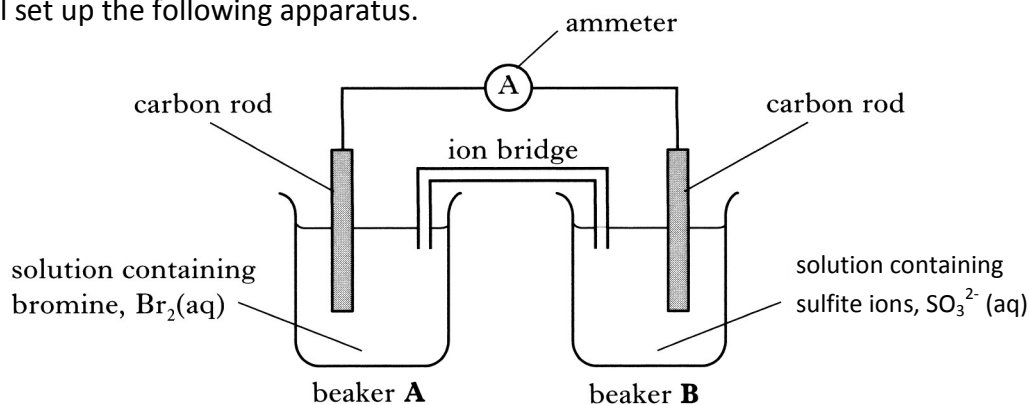
Answer _____

6. When hydrochloric acid with a pH of 3 is diluted with water to give a solution with a pH of 6, the concentration of

- A $H^+(aq)$ ions decreases
- B $OH^-(aq)$ ions decreases
- C $H^+(aq)$ ions and the concentration of $OH^-(aq)$ ions become equal
- D $H^+(aq)$ ions and the concentration of $OH^-(aq)$ ions remain unchanged.

Answer _____

7. A pupil set up the following apparatus.



In beaker **B** sulfite ions are converted to sulfate ions:



- a) On the diagram, mark clearly the path and the direction of the electron flow. 1
- b) i) What term is used to describe the type of reaction taking place in beaker **B**? 1
- _____
- ii) Suggest what would happen to the pH in beaker **B**. 1
- _____
- c) Write the ion-electron equation for the chemical reaction taking place in beaker **A**. Refer to the data booklet page 10 for help. 1
- _____

8. Tin and its compounds have many use.

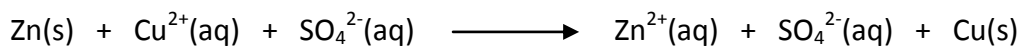
- a) Why do metals such as tin conduct electricity? 1
- _____
- _____
- b) Tin(IV) chloride, SnCl_4 , is used in the processing of glass and can be prepared as shown.
- $$\text{SnO}_2 + 4\text{HCl} \longrightarrow \text{SnCl}_4 + 2\text{H}_2\text{O}$$
- i) Name the type of reaction taking place. 1
- _____
- ii) Tin(IV) chloride is a liquid at room temperature. What type of bonding does this suggest is present in tin(IV) chloride? 1
- _____

9. A student was preparing for their National 5 Chemistry exam paper and started to write out a word bank with some of the important terms. Unfortunately the student failed to complete their word bank as shown below.

Complete the table to show each word or phrase with a correct meaning.

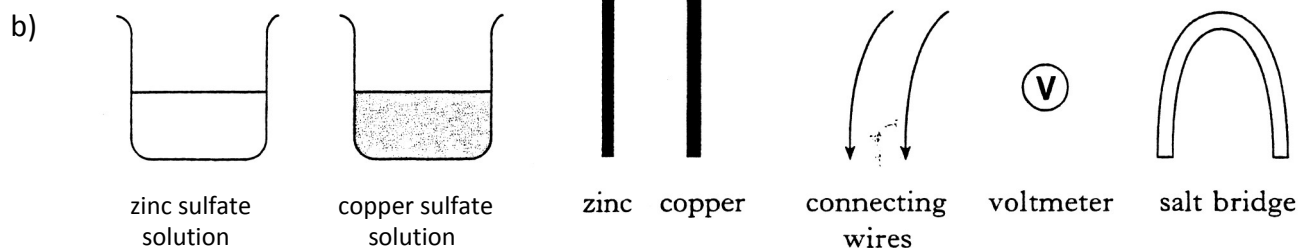
Word/phrase	Meaning
enzyme	
	The reaction which produces ethanol and carbon dioxide as glucose is broken down. Yeast is required as the catalyst.
nucleus	
esters	
	A type of bonding where oppositely charged ions are attracted to each other.
complete combustion	
	Ions that do not take part in a chemical equation but are present in the reaction mixture.
	A family of compounds which have the same general formula, similar chemical properties and gradually changing physical properties.
covalent network	
saturated	

10. Zinc reacts with copper sulfate solution.



a) Rewrite the equation omitting the spectator ions.

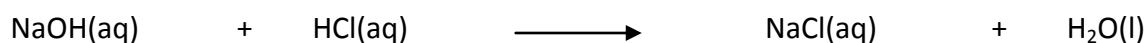
1



Draw a labelled diagram below to show how **all** the pieces of apparatus shown can be used to make a cell.

2

11. Sodium hydroxide solution will react with hydrochloric acid. A student was given the task of determining the concentration of hydrochloric acid by titrating 10 cm^3 samples of the acid. It was found that the average titre was 15.5 cm^3 of sodium hydroxide solution, concentration 2 mol l^{-1} .



Calculate the concentration of the hydrochloric acid.

Space for working.

_____ mol l^{-1} .

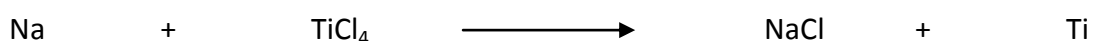
3

13. Titanium metal is used to make dental braces.



Titanium is extracted from its ore in the Kroll process. One step in this process involves the displacement of titanium chloride by sodium metal.

The equation for this is shown.



- a) Balance the chemical equation above. 1
- b) Determine the percentage by mass composition of titanium in titanium chloride, TiCl_4 .
Space for working and answer.

_____ % 3

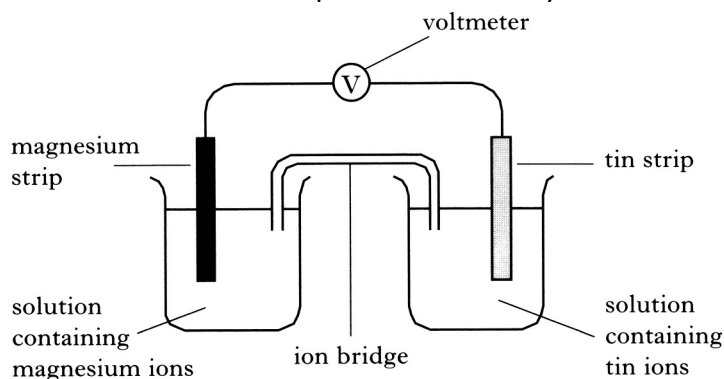
- c) What does this method of extraction tell you about the reactivity of titanium metal compared to sodium metal?
_____ 1

- d) During the displacement, sodium atoms, Na, form sodium ions, Na^+ .
Write the ion-electron equation for this change.
_____ 1

- e) The displacement reaction is carried out in an atmosphere of the noble gas, argon.
Suggest why an argon atmosphere is used.

_____ 1

14. The diagram below shows a cell which can produce electricity.



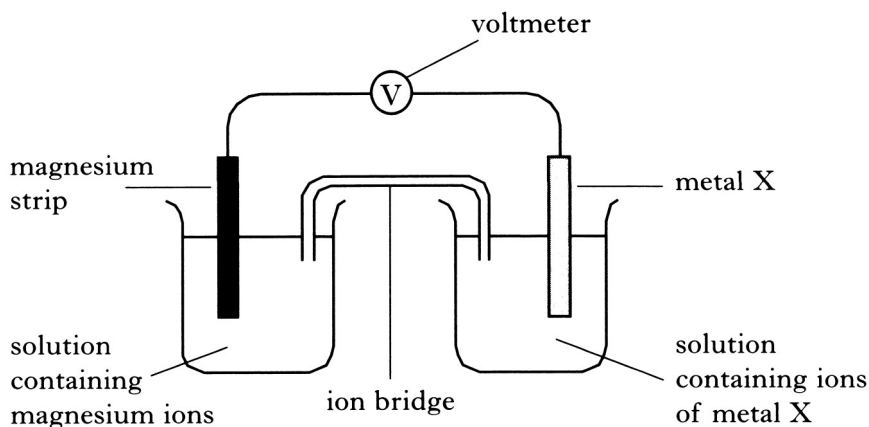
a) What is the purpose of the ion bridge?

_____ 1

b) Name a tin compound which could be used to make the solution containing tin ions. You may wish to refer to the data booklet page 8.

_____ 1

c) The following cell produces a higher voltage than the cell above.



Suggest a name for metal X. _____ 1

15. The table below gives information about some substances.

Substance	Melting Point /°C	Boiling Point /°C	Conduct as	
			solid	liquid
A	1890	3380	a solid yes	a liquid yes
B	963	1560	no	yes
C	1455	2730	yes	yes
D	-183	-164	no	no
E	712	1418	no	yes

a) Identify the **two** ionic compounds.

Answers _____ & _____

1

b) Identify the covalent molecular compound.

Answer _____

1

c) Identify the **two** metallic substances.

Answers _____ & _____

1

Total marks 42