

C5 Homework 2

1. Copper can be found as copper oxide contained in rock.

- (a) What is the name for a metal compound, found in rocks, from which the metal can be extracted?

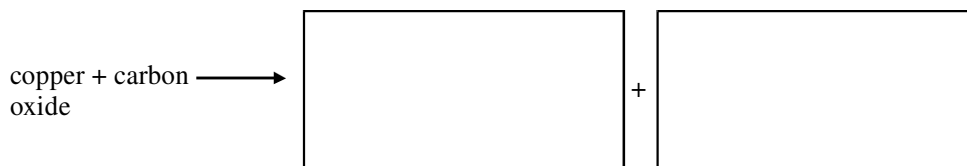
..... (1)

(b) Copper oxide reacts when mixed with carbon to produce copper.

- (i) What must be done to start the reaction?

..... (1)

(ii) Complete the word equation for this reaction.



(1)

- (iii) Copper oxide undergoes reduction in this reaction. Explain what is meant by **reduction**.

..... (1)

**(Total marks (4))**

2. Carbon dioxide, CO<sub>2</sub>, and silicon dioxide, SiO<sub>2</sub>, both occur widely in nature. Carbon dioxide sublimates at -78 °C. Silicon dioxide melts at 1728 °C. The two compounds have some similar chemical properties; for example, both react with alkalis. They also have some similar physical properties; for example both are electrical insulators.

- (a) (i) In what way are the electron arrangements of a carbon atom and a silicon atom the same?

..... (1)

(ii) Suggest why carbon dioxide and silicon dioxide have some similar properties.

.....  
..... (2)

- (b) (i) Suggest the type of **bonding** present in carbon dioxide and silicon dioxide. Give a reason for your answer.

Bonding .....

Reason .....

..... (2)

- (ii) Suggest the type of **structure** present in silicon dioxide.  
Give a reason for your answer.

Structure .....

Reason .....

..... (2)

- (iii) Describe the structure of **solid** carbon dioxide.

.....

.....

(2)

**(Total 9 marks)**

3. Calcium nitrate has a melting point of 561 °C and its solution in water conducts electricity.

- (a) What type of bonding is present in calcium nitrate?

.....

(1)

- (b) Calculate the relative formula mass of calcium nitrate,  $\text{Ca}(\text{NO}_3)_2$ .  
(Relative atomic masses: N = 14, O = 16, Ca = 40)

.....

(2)

**(Total 3 marks)**

4. Use words from the box to complete the following sentences.

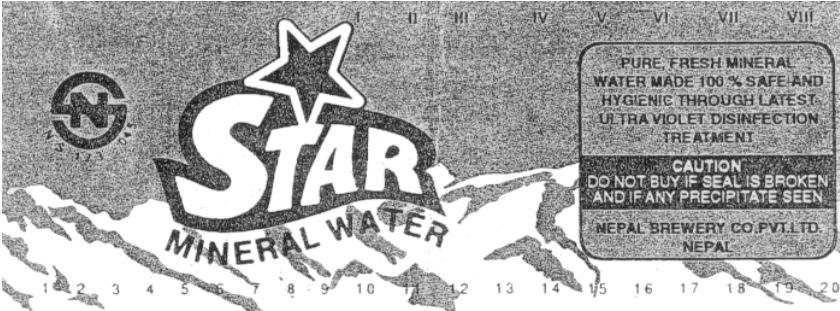
<b>combines    compound    diffuses    element    mixes    mixture</b>
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Water is a ..... which is formed when the .....

hydrogen ..... with oxygen.

**(Total 3 marks)**

5. This is part of a label from a bottle of mineral water.

Active Constituents (approx)		I    II    III    IV    V    VI    VII    VIII
Na <sup>+</sup>	65ppm	
K <sup>+</sup>	75ppm	
Ca <sup>2+</sup>	15ppm	
Mg <sup>2+</sup>	5ppm	
HCO <sub>3</sub> <sup>-</sup>	250ppm	
Cl <sup>-</sup>	50ppm	
SO <sub>4</sub> <sup>2-</sup>	5ppm	

(a) If the water is evaporated, the dissolved solids are left behind as a residue.

(i) One compound in the residue is calcium chloride.

What is the formula of calcium chloride?

.....

(1)

(ii) Another compound in the residue is sodium sulphate, Na<sub>2</sub>SO<sub>4</sub>.

Calculate the relative formula mass of sodium sulphate.

(Relative atomic masses: Na = 23, S = 32, O = 16)

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(2)

(b) Calcium and sodium are present in the water as metal ions.

Name another metal ion present in this mineral water.

.....

(1)

(c) Use the periodic table to help you describe the structure of a sodium **ion**.

You may draw a diagram in the space provided to help with your answer.

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(4)

(d) When hydrogen burns in air, water is formed.

(i) Write the balanced equation for this reaction.

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(3)

**(Total 11 marks)**

**Total marks (30)**