BACK TO SCHOOL CHEMISTRY TEST

D~EXAM

1. Active volcanoes produce many substances that are thrown out into the atmosphere. The table below shows the percentages of the gases coming from an active volcano in one of the countries of East Africa. The temperature just inside the volcano is above 1000^0c

Name of gas	Percentage of gas
Nitrogen	3.2
Water	35.6
Sulphur dioxide	11.7
Hydrogen	0.39
Carbon dioxide	47.4
Carbon monoxide	1.71

a. Scientists now recognize that the early atmosphere of the earth came from active volcanoes

i. Use the table above to decide which gas is present in the largest quantity in the gases that come the volcano. Write down its name and its formula.

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ii. Which process do you think causes the removal of much of this gas from the atmosphere?

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iii. Give three important differences between the quantities of gases from the East African volcano and those in our modern atmosphere.

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b. Explain why water is in gas state when it comes out of the volcano.

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c. The Earth's early atmosphere contained a large portion of water vapor. Explain what you think happened to all this water vapor.

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d. The first lakes were quite acidic. Name and give the formulae of two acids which may have been present in these lakes.

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2a. Distinguish between the terms compound and mixture, using specific examples.

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b. Here is a list of substances:

beer brass carbon monoxide cement lemonade

limestone methane sodium hydroxide stainless steel

sulphuric acid

Which of these substances are:

i. Compounds?

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ii. Mixtures?

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c. Pick the odd man out in each of groups and explain why it is different from the others.

i. Petrol, oil, air, solder:
   Old man out: ……
   Explanation: ……
ii. Lead nitrate, potassium oxide, chromium, hydrochloric acid, sand.
   Old man out: ……
   Explanation: ……
iii. HCl, F, MgO, FeS, CO_2
   Old man out: ……
   Explanation: ……

d. There are many types of mixtures, including gels, emulsions and foams. They are made by mixing different combinations of solids, liquids and gases

i. Complete the table below.

Example	Type of mixture	Mixture made from
Bread		
Mayonnaise		
Jelly		

3a. Complete the following paragraph.

Acids dissolve in water to produce …… ions which can be written as …… Alkalis are …… They dissolve in water to produce …… ions, which can also be written as …… Acids and alkalis react together to produce a solution with a pH of 7, these are called …… reactions.

b. Write an equation for the neutralization reaction which takes place when an acid reacts with an alkali.

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c. In a reaction between potassium carbonate and hydrochloric acid to produce potassium chloride crystals, the following method was used.

25cm^3 of hydrochloric acid was placed in a beaker. Solid potassium carbonate was added to the acid and effervescence was seen. The mixture was stirred and potassium carbonate was added until some remained at the bottom of the beaker. The mixture was then filtered and filtrate collected in evaporating basin. The filtrate was heated until one half had evaporated and crystals were starting to form. The solution which remained was allowed to cool and crystals formed.

i. Write a balanced chemical equation for the reaction.

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ii. Why was potassium carbonate added until some remained at the bottom of the beaker?

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iii. What was the name of the filtrate? …….

iv. What name is given to a solution which has crystals starting to form from it?

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4. Marble is a naturally occurring form of calcium carbonate, $CaCO_3$. When marble is heated, it decomposes in a chemical reaction to form quick lime by an endothermic reaction

ai. Give the name and chemical formula of substance A.

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ii. Give the name and formula of the further substance that is produced during decomposition of marble

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iii. What has to be added to substance A to make substance B?

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b. Name a further naturally occurring form of calcium carbonate.

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c. Give one use for each of substances A and B.

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5. Water is very good at dissolving at dissolving substances. It is, therefore, very unusual to find really pure water on this planet. The questions that follow are about the purification of water from a reservoir.

ai. How is filtration of water from reservoir carried out?

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ii. What is the purpose of filtering at this stage?

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b. Chlorine is added to the water near the end of purification process. Why is chlorine added?

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c. Chlorine produces an acidic solution containing two acids. The incomplete chemical equation is shown below. The acid shown as a product is called chloric(i) acid.

$Cl_{2(g)}$ + $H_2O_{(l)}$ ⟶ ……$_{(aq)}$ + $HOCl_{(aq)}$

What are the name and formula of the acid produced?

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d. Why is sodium hydroxide added after chlorination?

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e. To prevent tooth decay, an ion is often added to the water before it is supplied to homes. Name the ion and give its formula.

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f. Tap water usually contains chloride rather than chlorine. Explain in terms of electronic configuration what happens to chlorine when it is converted into chloride ions.

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END