

Chem!stry

Name: ()

Class:

Date: / /

Assignment on Acids, Bases and Salts #2

Acids and Acidic Oxides:

1. The table below gives the names of some common acids that are found in the school laboratory and / or at home. Write the chemical formula for each acid in the space provided and state whether the acid is a *strong acid* or a *weak acid*.

Name of Acid	Chemical Formula	Strength of Acid (Strong or Weak)
Ethanoic Acid		
Hydrochloric Acid		
Nitric Acid		
Phosphoric Acid		
Sulfuric Acid.		

2. Emma performed several experiments and observed the following reactions.
- a) When hydrogen chloride was dissolved in water, the product was able to conduct electricity. Explain this observation and write down the chemical equation, with state symbols, for the reaction.
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- b) When hydrogen chloride was dissolved in hexane (a non-polar, organic solvent) the product was not able to conduct electricity. Explain why.
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- c) i) A strip of magnesium was added to the solution formed in a) above. Describe what you would observe and write a balanced chemical equation for the reaction.
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- ii) A strip of magnesium was added to the solution formed in b) above. Describe what you would observe.
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3. Nina has two bottles, each one contains the solution of an aqueous salt. Bottle **A** contains aqueous sodium chloride and Bottle **B** contains aqueous sodium carbonate. Describe a chemical test, including any observations and balanced chemical equations, that Nina could use to differentiate between the aqueous sodium chloride and aqueous sodium carbonate.

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4. Hydrochloric acid is a *monobasic acid* while sulfuric acid is a *dibasic acid*. Explain the difference between a *monobasic acid* and a *dibasic acid*.

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5. One of the steps in the preparation of sodium sulfate crystals is to titrate an aqueous solution of sodium hydroxide against a dilute solution of sulfuric acid.

a) i) Write the balanced chemical equation, including state symbols, for the reaction between sodium hydroxide and sulfuric acid.

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ii) What is the name given to this type of reaction?

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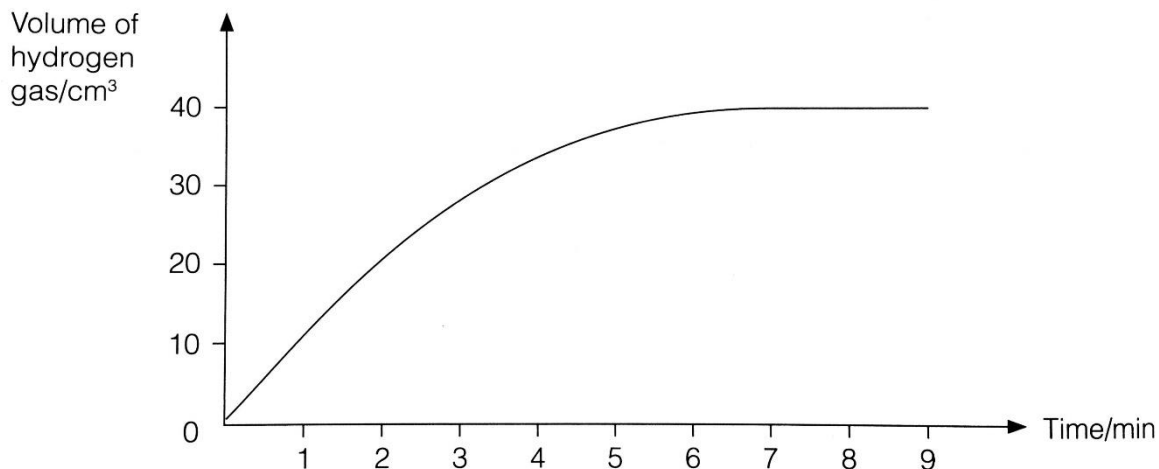
b) i) Sulfuric acid is a *strong acid*. Define the term *strong acid*.

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ii) Describe a chemical test that could be used to distinguish between a strong acid and a weak acid.

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6. The graph below shows the volume of hydrogen gas given off when 0.4 g of a reactive metal was added to a dilute solution of sulfuric acid.



- a) i) Suggest a suitable reactive metal that can be used in the reaction described above.

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- ii) Write a balanced chemical equation, including state symbols, for the reaction between dilute sulfuric acid and the metal that you have chosen.

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- b) Study the graph. How long did it take for the reaction to finish?

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- c) Describe the qualitative test for hydrogen gas.

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7. Describe a simple experiment that could be performed in order to demonstrate that sulfur dioxide gas is an acidic oxide.

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Bases, Oxides and Indicators:

8. a) The table below gives the names of some common alkalis that are found in the school laboratory. Complete the table by writing the correct formulae in the spaces provided.

Name of Alkali	Chemical Formula
Sodium Hydroxide	
Potassium Hydroxide	
Calcium Hydroxide	
Ammonium Hydroxide	

- b) Describe two physical properties of alkalis.

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9. The table below shows the pH values of five solutions, **A, B, C, D** and **E**.

Solution	A	B	C	D	E
pH Value	2	7	8	13	5

- a) State which solution is:

- i) Neutral:
- ii) Strongly alkaline:
- iii) Weakly alkaline:
- iv) Strongly acidic:
- v) Weakly acidic:

- b) i) Which pair or pairs of solutions, when added together in equal quantities, would produce a *neutral* product?

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- ii) Which pair or pairs of solutions, when added together in equal quantities, would produce an *acidic* product?

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- iii) Which pair or pairs of solutions, when added together in equal quantities, would produce an *alkaline* product?

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10. Sodium phosphate, Na_3PO_4 , is used as a water softener and cleaning agent because it can remove calcium ions and magnesium ions from water.

a) i) Give the name and formula of the alkali that can be added to dilute phosphoric acid, H_3PO_4 , to produce sodium phosphate.

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ii) Write a balanced chemical equation, including state symbols, for the reaction in a) i).

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b) i) The alkali used in a) reacts with ammonium chloride to produce ammonia gas. Describe the test for ammonia gas.

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ii) What essential step should be taken to ensure that the ammonia gas is evolved?

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iii) Write a balanced chemical equation, including state symbols, for the reaction in b) i).

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11. Farmers control the pH of the soil that they grow their crops in by adding calcium hydroxide. They will also treat the soil with fertilizers, such as ammonium nitrate, to provide the plants with nitrogen, an element that is essential for making proteins. Explain why a farmer should not add calcium hydroxide and ammonium nitrate to the soil at the same time. Support your answer with a relevant balanced chemical equation, including state symbols.

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12. The table below shows the colours of some common indicators at different pH values.

Indicator	pH													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Methyl Orange	red			yellow										
Bromocresol Green	yellow				blue									
Phenol Red	yellow						red							
Phenolphthalein	colourless								red					

- a) What colour will a solution of pH 3 become when a few drops of bromocresol green are added to it?

- b) What colour will a solution of pH 7 become when a few drops of phenol red are added to it?

- c) A solution turns yellow when either methyl orange or phenol red is added to it. What is the approximate pH of the solution?

- d) A mixture of all four indicators is added to a strong acid. What will be the colour of the resulting mixture?

13. a) Complete the following table.

Chemical Name	Nitrogen Dioxide	Nitrogen Monoxide	Silicon(IV) Oxide	Carbon Monoxide	Lithium Oxide	Barium Oxide
Chemical Formula						
Acid / Base Nature						

- b) Describe how you would obtain a pure sample of copper(II) oxide from a mixture of copper(II) oxide and zinc oxide. Explain your reasoning.

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- Scan the QR code given below for the answers to this assignment.



http://www.chemist.sg/acids/acids_assignment_2_ans.pdf