PART ONE: MULTIPLE CHOICE QUESTIONS

1. A student added dilute hydrochloric acid to four metals and recorded the results.

   Not all of the results are correct.

	results	
	metal	gas given off
1	copper	yes
2	iron	yes
3	magnesium	no
4	zinc	yes

Which two results are correct?

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

2. Carbon dioxide is an acidic oxide that reacts with aqueous calcium hydroxide.

   Which type of reaction takes place?

   A. Decomposition
   B. Fermentation
   C. Neutralization
   D. Oxidation

3. Which is not a typical property of an acid?
   A. They react with alkalis producing water.
   B. They react with all metals producing hydrogen.
   C. They react with carbonates producing carbon dioxide.
   D. They turn litmus paper red.

4. Which type of compound reacts with an acid to give off a gas that turns lime water milky?
   A. Carbonates
   B. Hydroxides
   C. Oxides
   D. Sulphates

5. Which pair of substances can be used to prepare a sample of lead (II) chloride when added to water and mixed?
   A. lead and sodium chloride
   B. lead(II) nitrate and sodium chloride
   C. lead(II) carbonate and sodium chloride
   D. lead and hydrochloric acid

6. Which process is used in the preparation of soluble salts?
   A. Electrolysis
   B. Evaporation
   C. Melting
   D. Neutralization

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7. Which pair of substances reacts to form a salt and water only?

A aqueous sodium chloride and aqueous silver nitrate

B aqueous sodium hydroxide and dilute ethanoic acid

C aqueous sodium carbonate and dilute sulfuric acid

D zinc and dilute hydrochloric acid

8. Which substance is insoluble in water?

A. Ammonium carbonate
B. Ammonium nitrate
C. Calcium carbonate
D. Calcium nitrate

9. potassium hydroxide + sulphuric acid ⟶ potassium sulphate + water

Which compound is the salt in the reaction shown by the above equation?

A. Potassium hydroxide
B. Potassium sulphate
C. Sulphuric acid
D. Water

10. Which of the following solutions is most acidic?

Solution	pH Value
A	8
B	7
C	4
D	2

11. Which hazard does the following symbol indicate?



A. Corrosive
B. Flammable
C. Irritant
D. Toxic

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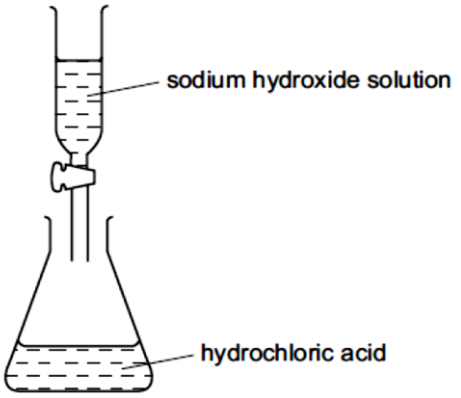
12. The formula for **magnesium sulphate** is
    A. MgS
    B. $MgSO_4$
    C. $MgSO_3$
    D. MgS_2O_3

13. Which of the following substances will **not** produce a gas when added to dilute hydrochloric acid?
    A. Copper
    B. Zinc
    C. Copper carbonate
    D. Zinc carbonate

14. In a neutralization reaction between an acid and an alkali, the pH:

    A of the acid increases
    B of the acid is unchanged
    C of the alkali increases
    D of the alkali is unchanged.

15. Sodium hydroxide solution was added to dilute hydrochloric acid. The pH of the solution in the flask was measured at intervals until no further change of pH took place.

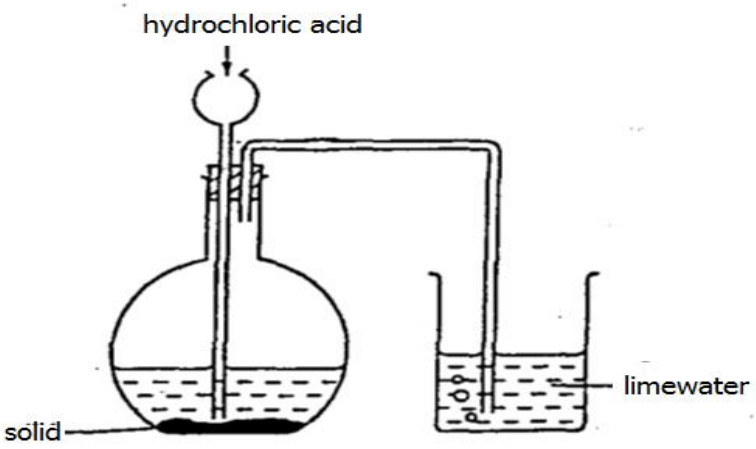


What would be the pH change in this reaction?
    A. Decrease to 1
    B. Decrease to 7
    C. Increase to 7
    D. Increase to 12

16. Which of the following is the PH value of an alkaline solution?
    A. 1
    B. 5
    C. 7
    D. 9

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17. Hydrochloric acid was added to a solid as shown.



The gas produced turned the limewater milky.
What was the solid?

A. Sodium carbonate
B. Sodium chloride
C. Sodium hydroxide
D. Sodium oxide

PART TWO: STRUCTURED QUESTIONS

Question1

Complete the following symbol and word equations of neutralization reactions (you will need to balance the symbol equations):

a) $HCl\ (aq) + MgO\ (s) \longrightarrow$ _____ + _____

b) $H_2SO_4\ (aq) + KOH\ (aq) \longrightarrow$ _____ + _____

c) $HNO_3\ (aq) + NH_4OH\ (aq) \longrightarrow$ _____ + _____

d) $C_2H_3OOH(aq) + NaOH\ (aq) \longrightarrow$ _____ + _____

e) $HNO_3\ (aq) + Ca(OH)_2\ (aq) \longrightarrow$ _____ + _____

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Question 2

Match each term with the correct definition.

1. Arrhenius acid	(a) proton acceptor
2. Arrhenius base	(b) proton donor
3. Brønsted acid	(c) produces H^+ in water
4. Brønsted base	(d) produces OH^- in water

Question 3

Define the following terms, and give an example of each.

a) acid

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b) base

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c) salt

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Question 4

List three general properties

(a) of acidic solutions and

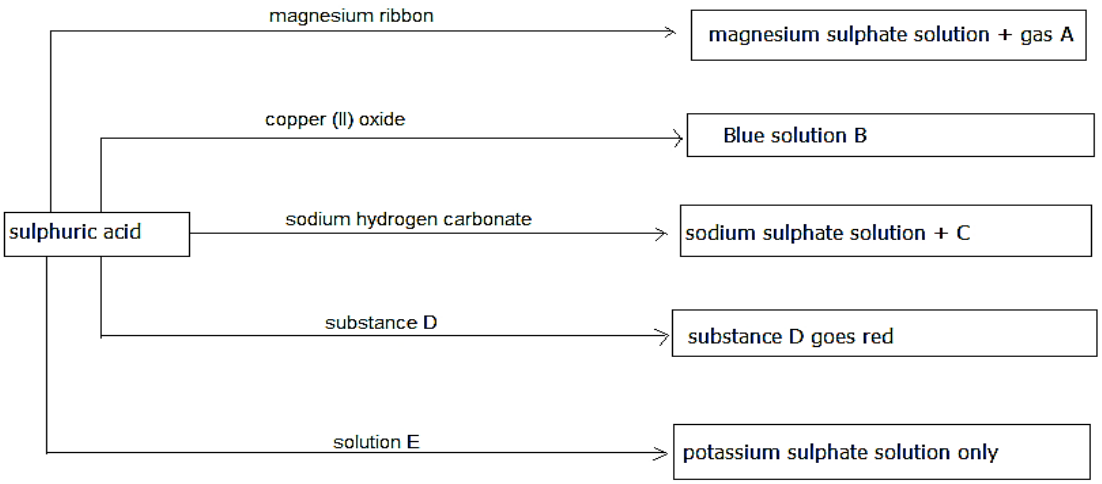
1. .....
2. .....
3. .....

(b) of basic solutions.

1. .....
2. .....
3. .....

Question 5

The diagram below shows some reactions of dilute sulfuric acid. Use it to answer the questions below.



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Name and give the formula of each of the following:

(a) Gas A: Name .....
Formula .....

(b) Solution B: Name .....
Formula .....

(c) Gas C: Name .....
Formula .....

(d) Substance D: Name .....
Formula .....

(e) Solution E: Name .....
Formula .....

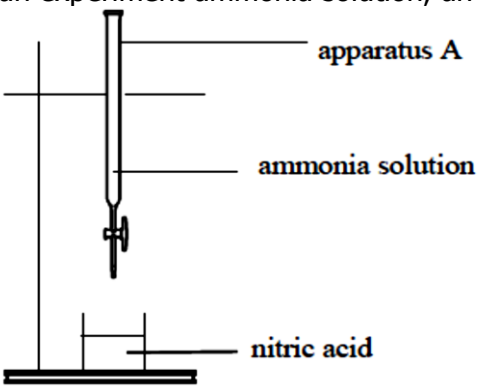
Question 6
For each of the following salts: decide which method you will use to make the salt and select suitable chemicals;

Salt you are going to make	**Starting chemicals you will use**	**The method you will use**
magnesium sulfate		
sodium nitrate		
calcium chloride		
barium chloride		
ammonium nitrate		
copper ethanoate		

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Question 7

a) In an experiment ammonia solution, an alkali, was added to nitric acid.



i. What is the name of apparatus A?

.....

.....

ii. What is the name of the reaction when the acid reacts with the alkali?

.....

.....

iii. What is the pH when just enough ammonia solution is added to react with all the nitric acid?

.....

.....

b) i) What is the ion which is present in any solution of acid?

.....

.....

ii) What is the ion which is present in any solution of alkali?

.....

.....

iii) Write the simplest ionic equation which represents the above reaction.

.....

Question 8

Below are the chemical formulae of four acids.

HCl H_2SO_4 HNO_3 CH_3COOH

a) What colour would they all turn a solution of litmus?

.....

.....

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b) Give the names of all of the above acids.

HCl .....

H_2SO_4 .....

HNO_3 .....

CH_3COOH .....

c) Which acid is found in car batteries?
.....
.....

d) Which acid is found in vinegar?
.....
.....

e) Which acid is found in human stomach?
.....
.....

Question 9

Magnesium and dilute hydrochloric acid react to produce magnesium chloride solution and hydrogen.

$$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$$

a) State **one** observations that could be made during the reaction.
1.....

b) Write an ionic equation of the reaction above.
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.....

c) Write a net ionic equation of the reaction.
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Question 10

a) What is the hydrogen ion concentration of a solution that has a pH of 4?
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b) What is the pH of a solution that has a hydrogen ion concentration of 1.0×10^{-11} M?
.....
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END

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