

## Exam Questions

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- 2 Fossil fuels such as coal and oil contain sulphur impurities. When they are burnt, the sulphur burns too. The poisonous gas produced is one of the causes of acid rain.
- (a) Complete the following word equation for the combustion of sulphur:  
 sulphur + ..... → .....  
 (1 mark)
- (b) Explain how the gas that is produced when sulphur burns forms acid rain.  
 (1 mark)
- (c) When acid rain falls on limestone (calcium carbonate), a chemical reaction takes place.
- (i) What is the process in which chemicals erode rocks called?  
 (1 mark)
- (ii) A gas is produced when acid rain reacts with limestone. When collected and bubbled through limewater, the gas turns the limewater milky. Give the name of the gas.  
 (1 mark)
- 3 An environmentalist is studying a lake in Norway. He is recording the species that he observes living in the lake and is taking measurements of factors such as the pH of the water. Below is a summary of part of his report, and a table showing the minimum pH levels that some organisms can tolerate.

*The pH of the water was very low, only pH 4.3. I observed no trout or perch at all. I observed a few frogs in the shallows. Drastic action will need to be taken if this lake is ever to support fish again.*

organism	minimum pH tolerated
trout	5.0
perch	4.5
frogs	4.0

- (a) Why did the environmentalist observe frogs living in the lake, but no fish?  
 (2 marks)
- (b) A study done 15 years before had found both trout and perch living in the lake. Suggest one reason why the pH level of the lake might since have fallen so low.  
 (1 mark)
- (c) In 1998, a decision was made to add powdered limestone to the lake to raise the pH of the water. Explain why this increased the pH of the water.  
 (1 mark)
- (d) By 2000, trout and perch were living in the lake. However, in 2003, the pH of the lake began to fall again and the fish populations decreased. Explain why the pH level began to fall.  
 (1 mark)
- (e) Suggest a solution to the problem behind this low pH which would last for longer than "liming".  
 (1 mark)

## Revision Summary

Here we are again — another jolly Revision Summary to cheer up your dreary day. Don't forget, these questions are only here to make sure you've learnt everything you should've done. You're supposed to be able to answer all of these questions effortlessly — and you're supposed to keep practising them until you can. OK, I grant you it's not the most exciting thing you can do of an evening, but there you go — nobody ever said life was going to be all fun and sunshine, did they...

- 1) List the reactivity series in the correct order. Take the first letter of each element and make up a rhyme to help you remember it — there, that'll cheer you up.
- 2) Which metal in that reactivity series is hardest to remove from its ore?
- 3) Why was aluminium very rare in the 1600's?
- 4) Describe what you see when the following metals are burnt in air:  
a) magnesium    b) sodium    c) silver.
- 5) How do very reactive metals in the reactivity series react with water?
- 6) What does magnesium "take" from a water molecule when it reacts with steam?
- 7) Why does aluminium seem so unreactive when it's so high in the reactivity series?
- 8) What do metals produce when they react with an acid?
- 9) Which metal will react the most violently with acid?
- 10) What is the test for hydrogen?
- 11) What does displacement mean?
- 12) What is the rule for displacement reactions?
- 13) Explain why magnesium can displace copper from copper sulphate.
- 14) List the eight properties of acids and the six properties of alkalis.
- 15) Give the names and formulae of six acids and six bases.
- 16) Describe how you would measure the pH of an unknown liquid.
- 17) Classify the following as either *an acid*, *a base* or *a salt*: (Answers on page 165.)  
a) citric acid    b) calcium oxide    c) calcium carbonate    d) sodium chloride    e) formic acid.
- 18) What is neutralisation?
- 19) How can indigestion be helped using neutralisation?
- 20) Give an equation for a base reacting with hydrochloric acid in the stomach.
- 21) What happens to a crop if the soil it has grown in has the wrong pH?
- 22) Give the general equation for an acid reacting with a metal.
- 23) Baked beans are acidic — what will they do inside a dented steel can?
- 24) Why is all rain naturally acidic?
- 25) Give the general equation for an acid reacting with a metal carbonate.
- 26) Bacteria in plaque feed on the sugar left on your teeth and produce acid.  
Why is it a good idea to use bicarbonate toothpaste and brush the plaque off twice a day?
- 27) What's the test for carbon dioxide?
- 28) Outline the method used to make common salt — sodium chloride.
- 29) Hydrochloric acid makes chloride salts — what salts does sulphuric acid make?
- 30) What kind of salts do you get from nitric acid?

8 Use the information in the table below to answer all of the questions.

Indicator solution	pH Scale													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Phenolphthalein	colourless									pale pink		red		
Litmus	red				purple			blue						
Methyl orange	red			orange		yellow								

a Using the indicators, the following results were obtained. Complete the table by adding the correct colour.

Substance	Colour of indicator		
	Phenolphthalein	Litmus	Methyl orange
Fruit juice	colourless		orange
Washing up liquid	pale pink	blue	
Soda water		red	orange

b In neutral solutions, the individual indicators show different colours.

i Methyl orange is:

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ii Phenolphthalein is:

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TOTAL



5

iii Litmus is:

\_\_\_\_\_

c i Pure water has a pH of 7. What colour would it turn a litmus solution?

\_\_\_\_\_

ii Baking powder solution has a pH of 9. What colour would it turn phenolphthalein?

\_\_\_\_\_

A lamp is removed from circuit B. Describe what happens to the other bulb in the circuit.



A lamp is removed from circuit D. Describe what happens to the other bulbs in the circuit.

Write the correct letter in the box.



TOTAL  
  
 3