

<b>NAME</b>	<b>INDEX NUMBER</b>
<b>SCHOOL</b>	<b>DATE</b> _____

## SULPHUR AND ITS COMPOUNDS

1. **1989 Q 31**

In the manufacture of Sulphuric acid some gases are released to the atmosphere.  
Name the gases and explain how they form acid rain. (2

marks)

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2. **1991 Q 20**

Name the type of reaction that takes place between concentrated Sulphuric acid  
and sulphur. (2

marks)

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3. **1993 P1 Q 16**

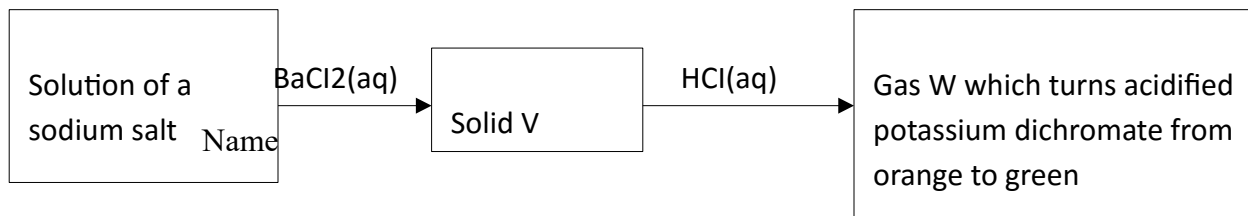
Give two reasons why during manufacture of sulphuric acid, sulphur trioxide gas  
is dissolved in concentrated sulphuric acid, instead of dissolving it in water  
directly. (2

marks)

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4. 1994 P1A Q6

Study the flow chart below and answer the questions that follow.



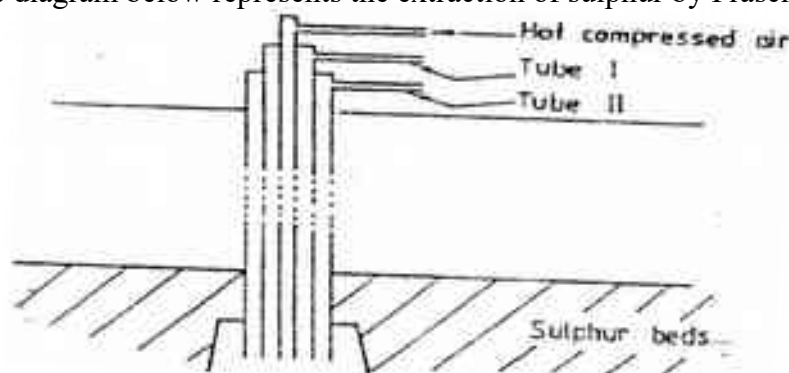
Name solid V and gas W.  
(2 marks)

(2)

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5. 1995 Q17

The diagram below represents the extraction of sulphur by Frasch process



a) Name the substance that passes through tube;

I .....

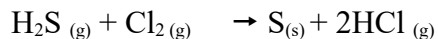
II .....

b) What is the purpose of hot compressed air in this process?  
(1 mark)

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6. 1996 Q 24

In an experiment, 2.4g of sulphur was obtained by reacting hydrogen sulphide and chlorine as shown by the equation below:



(a) Which of the reactants acts as a reducing agent in the above reaction? Explain. (1 mark)

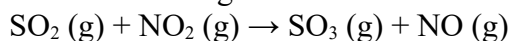
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(b) Given that the yield of sulphur in the above reaction is 75%, calculate the number of moles of  $\text{H}_2\text{S}_{(g)}$  used in the reaction (S=32.0)

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**7. 1999 Q 5**

Sulphur dioxide and nitrogen dioxide react as shown in the equation below



(i) Using the oxidation numbers of either sulphur or nitrogen, show that this is a redox reaction

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.....

(ii) Identify the reducing agent

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**8. 1999 Q 11**

In an attempt to prepare sulphur dioxide gas, dilute sulphuric acid was reacted with barium sulphuric. The yield of sulphur dioxide was found to be negligible. Explain

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**9. 2000 Q 23**

When a solid sample of sulphur is heated in a test tube, it changes into a liquid, which flows easily. On further heating, the liquid darkens and does not flow easily. Explain these observations.

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**10. 2001 Q 11**

A certain matchstick head contains potassium chlorate and sulphur. On striking the two substances react to produce sulphur dioxide and potassium chloride. Explain the environmental effect of using such matches in large numbers.

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**11. 2001 Q 12**

Describe a simple laboratory experiment that can be used to distinguish between sodium sulphide and sodium carbonate.

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**12. 2001 Q 20**

a) What observation would be made if hydrogen sulphide gas was bubbled through a solution of zinc nitrate?

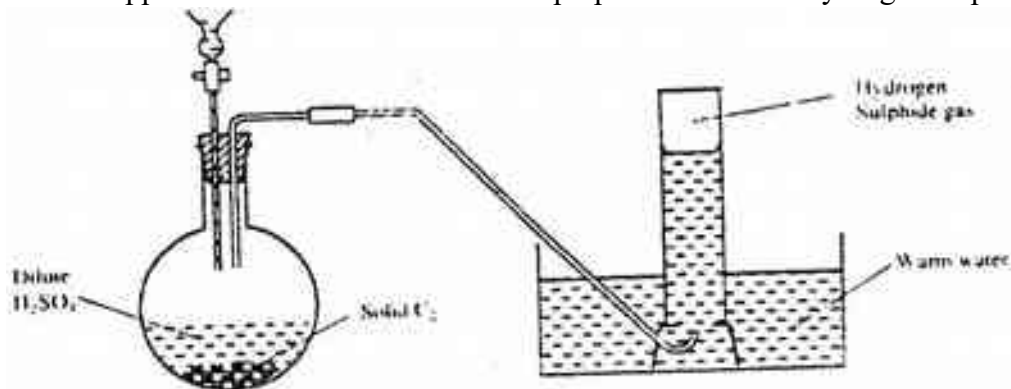
.....  
.....  
.....

b) Write an equation for the reaction that takes place in (a) above



13. 2002 Q 8

The apparatus shown below was set to prepare and collect hydrogen sulphide



(a) Name solid C<sub>2</sub>

(b) Give a reason why warm water is used

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(c) What observation would be made if hydrogen sulphide gas was bubbled into a solution of lead II nitrate?

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14. 2002 Q 12

Concentrated sulphuric acid was added to iron II sulphate acidified with sulphuric acid and the mixture heated. The solution turned from pale green to yellow with evolution of brown gas. Explain these observations.

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**15. 2002 Q 21**

In an experiment 30cm<sup>3</sup> of 0.1 M sulphuric acid were reacted with 30cm<sup>3</sup> of 0.1 M sodium hydroxide

(a) Write in equation of the reaction that took place

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(b) State the observations that were made when both blue and red litmus papers were dropped into the mixture

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(c) Give a reason for your answer in (a) above

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**16. 2003 Q 15 P2**

Oleum (H<sub>2</sub>S<sub>2</sub>O<sub>7</sub>) is an intermediate product in the industrial manufacture of sulphuric acid

(a) How is oleum converted into sulphuric acid? (1 mark)

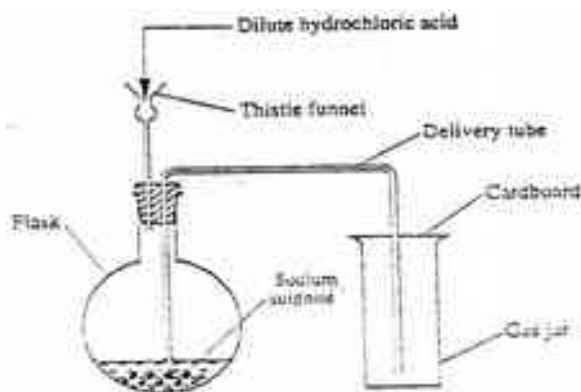
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(b) Give one use of sulphuric acid (1mark)

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17. 2004 Q 4

Dilute hydrochloric acid and solid sodium sulphite were reacted as shown in the set-up below



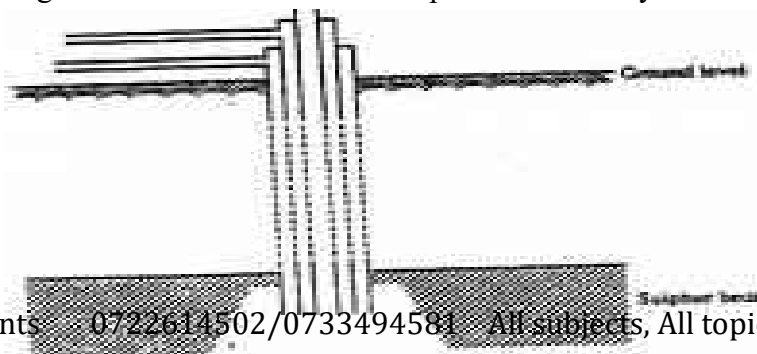
a) Name the gas produced in the flask  
(2marks)

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b) Give two reasons why no gas was collected in the gas jar. (2marks)

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18. 2004 Q 3

a) The diagram below illustrates how sulphur is extracted by the Frisch process.



Label the pipe through which superheated water is pumped in (1 mark)

b. The equation below shows the oxidation of sulphur dioxide to sulphur trioxide in the contact process.



(i) Name one catalyst for this reaction (1 mark)

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(ii) State and explain the effect on the yield of sulphur trioxide when:  
I The temperature increased (2marks)

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.....  
.....

II The amount of oxygen is increased (2marks)

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(iii) Describe how sulphur trioxide is converted to sulphuric acid in the contact process. (2 marks)

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(c) State two disadvantages of having sulphur dioxide in the environment  
(2marks)

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(d) Ammonia sulphate is a fertilizer produced by passing ammonia gas into concentrated sulphuric acid.

(i) Write the equation for the reaction  
(1mark)

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(ii) Calculate the mass in Kg of sulphuric acid required to produce 25kg of the fertilizer (S= 32.0; O= 16.0; N = 1.0)

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**19. 2005 Q 8**

Determine the oxidation state of sulphure in the following compounds: (2 marks)

a)  $H_2S$  .....

b)  $Na_2S$  .....

**20. 2005 Q 24**

In an experiment, a gas jar containing most sulphur dioxide was inverted over another gas jar containing hydrogen sulphide gas

a. State and explain the observation that was made  
(2marks)

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.....  
b. State the precaution that should be taken when carrying out this experiment

(1mark)

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**21. 2006 Q 6**

In an experiment to study the properties of concentrated sulphuric acid, a mixture of the acid and wood charcoal was heated in a boiling tube.

(a) Write the equation of the reaction that took place in the boiling tube.

(1mark)

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(b) Using oxidation numbers, show that reduction and oxidation reactions took place in the boiling tube.

(2 marks)

(2)

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**22. 2006 Q 16**

When hydrogen sulphide gas was bubbled into an aqueous solution of iron (III) chloride, a yellow precipitate was deposited.

(1 mark)

a) The standard reduction potential for  $\text{Fe}^{2+}(\text{aq})$  is  $-0.44$  volts. Select the element which would best protect iron from rusting.

(1 mark)

.....  
.....

b) Write an equation for the reaction that took place.

(1 mark)

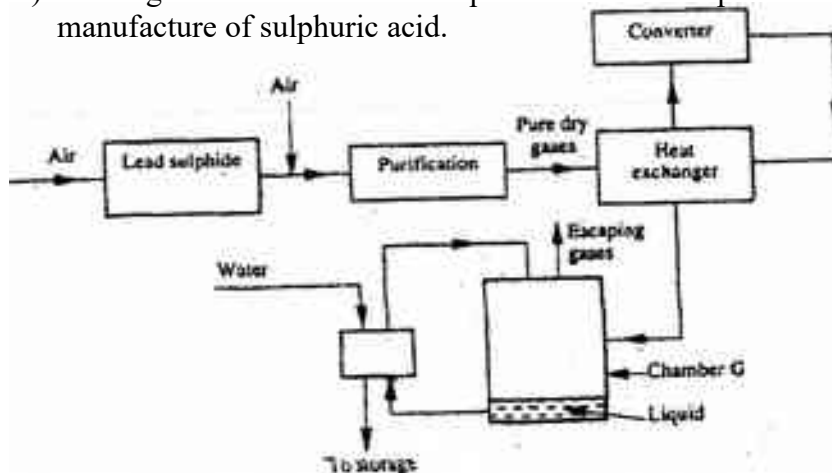
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 .....  
 c) What type of reaction was undergone by hydrogen by hydrogen sulphide in this reaction?

(1 mark)

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**23. 2006 Q 4 P2**

a) The diagram below shows some processes that take place during the industrial manufacture of sulphuric acid.



(i) Write the equation for the reaction in which sulphur dioxide gas is produced.

(1 mark)

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(ii) Why is it necessary to keep the gases pure and dry?  
 (1 mark)

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(iii) Describe the process that takes place in chamber G.  
 (1 mark)

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(iv) Name the gases that escape into the environment.  
(1mark)

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(v) State and explain the harmful effect on the environment of one of the gases named in (iv) above  
(1mark)

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(vi) Give one reason why it is necessary to use a pressure of 2-3 atmospheres and not more.  
(1mark)

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b) (i) Complete the table below to show the observations made when concentrated sulphuric acid is added to the substances shown.  
(2marks)

Substance	Observation
Iron fillings	
Crystals of white sugar	

(ii) Give reasons for the observations made using:  
I iron fillings

(1mark)

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.....

II Crystals of white sugar.

(1mark)

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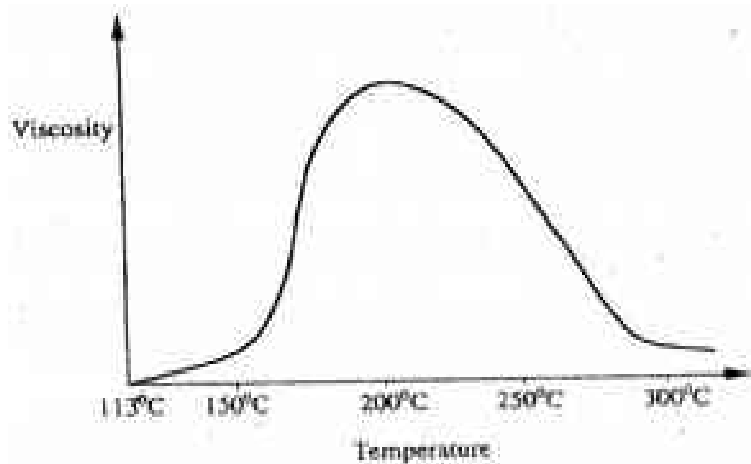
(c) Name one fertilizer made from sulphuric acid.  
(1mark)

.....  
(d) Suggest a reason why  $\text{BaSO}_4$  (a pigment made from sulphuric acid) would be suitable in making paint for cars.  
(1mark)

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23. 2007 Q 30

Below is a sketch of a graph showing the change in viscosity? (Ease of flow) with temperature when solid sulphur is heated.



Describe what happens to the sulphur molecules when sulphur is heated from 150°C to about 200°C.

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24. 2008 Q 8

a) State the observation made at the end of the experiment when a mixture of

iron powder and sulphur is heated in a test tube.

(1mark)

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b) Write an equation for the reaction the product in (a) above and dilute hydrochloric acid.

(1mark)

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c) When a mixture of iron powder and sulphur is heated, it glows more brightly than that of iron fillings and sulphur. Explain this observation

(1mark)

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**25. 2008 Q 9**

Zinc reacts with both concentrated and dilute sulphuric (VI) acid. Write equations for two reactions.

(2marks)

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**26. 2008 Q 30**

Crude oil contains sulphur. What would be the effect to the environment of using fuel containing sulphur?

(1mark)

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27. 2009 Q 22

A student added very dilute sulphuric (VI) acid to four substance and recorded the observations shown in the table below

Test	Substance	Gas given off
1	Sodium	Yes
2	Iron	No
3	Carbon	Yes
4	Copper	No

For which tests chart below to answer the questions that follow.

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28. 2010 Q 11

Hydrogen sulphide is a highly toxic and flammable gas. It is normally prepared in a fume chamber.

- a) Name **two** reagents that can be used to prepare hydrogen sulphide in the laboratory.  
(1 mark)

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.....  
.....

- b) One of the uses of hydrogen sulphide is to produce sulphur as shown in the following equation;



Identify the reducing agent in this reaction and give a reason for your answer. (1 mark)





ii) Write an equation for the process that takes place in the absorption chamber  
(1 mark)

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.....

c) Vanadium (V) Oxide is a commonly used catalyst in the contact process.  
i) Name another catalyst which can be used for this process.  
(1mark)

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.....

ii) Give two reasons why vanadium (V) Oxide is the commonly used catalyst  
(2 marks)

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d) State and explain the observation made when concentrated sulphuric acid is added to crystals of copper (II) sulphate in a beaker. (2 marks)

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e) The reaction of concentrated sulphuric (VI) acid with sodium chloride produces hydrogen chloride gas. State the property of concentrated sulphuric (VI) acid illustrated in this reaction

(1 mark)

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f) Name four uses of sulphuric (VI) acid. (2 marks)

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**30. 2012 Q18 P1**

Acidified potassium manganate (VII) solution is decolourised when sulphur (IV) oxide is bubbled through it. The equation for the reaction is given below.



(a) Which reactant is oxidised? Explain. (2 marks)

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(b) Other than the manufacture of sulphuric (VI) acid, state other use of sulphur (IV) oxide (1 mark)

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**31. 2012 Q25 P1**

Describe how a solid sample of potassium sulphate can be prepared starting with 200cm<sup>3</sup> of

2M potassium hydroxide. (3 marks)

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