

Manufacture and uses. Includes sulfur dioxide questions

Question Paper 1

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Sulfur
Sub-Topic	Manufacture and uses.
Booklet	Question Paper 1

Time Allowed: 19 minutes

Score: /16

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

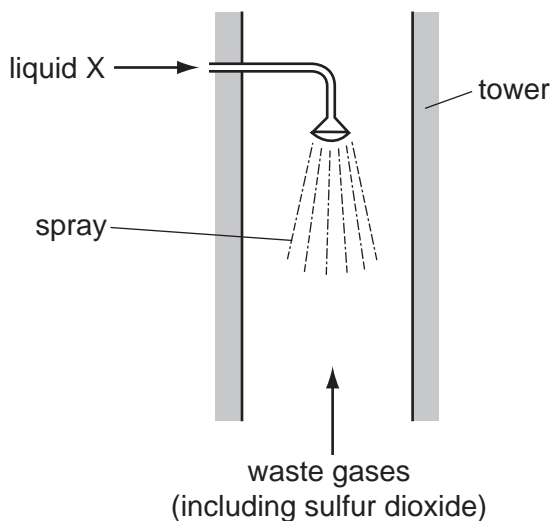
1. Statement 1: The burning of fossil fuels containing sulfur is a cause of 'acid rain'.

Statement 2: Acid rain contains sulfur dioxide which is formed when sulfur compounds burn in the air.

Which of the following is true?

- A** Both statements are correct and statement 2 explains statement 1.
- B** Both statements are correct, but statement 2 does not explain statement 1.
- C** Statement 1 is correct but statement 2 is incorrect.
- D** Statement 2 is correct but statement 1 is incorrect.

2. When coal and oil burn in power stations, the acidic gas sulfur dioxide is formed. Sulfur dioxide is removed by absorbing it in a liquid sprayed down a tower.



What is liquid X?

- A** calcium hydroxide solution
- B** sodium chloride solution
- C** dilute hydrochloric acid
- D** water

3. Acid rain is formed when sulfur dioxide and oxides of nitrogen dissolve in rain water.

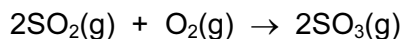
Which problem is **not** caused by acid rain?

- A breathing difficulties
- B dying trees
- C erosion of statues
- D lowered pH of lakes

4. Which compound is **not** a fertiliser?

- A ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$
- B calcium hydroxide, $\text{Ca}(\text{OH})_2$
- C potassium chloride, KCl
- D urea, $\text{CO}(\text{NH}_2)_2$

5. The equation for an exothermic reaction in the Contact process is shown.



Which effects do increasing the temperature and using a catalyst have on the rate of formation of sulfur trioxide, SO_3 ?

	increasing the temperature	using a catalyst
A	rate decreases	rate decreases
B	rate decreases	rate increases
C	rate increases	rate decreases
D	rate increases	rate increases

6. The Contact process is used for the manufacture of sulfuric acid.

Which statement about this process is **not** correct?

- A A catalyst of iron is used.
- B Oxygen from the air is used to react with sulfur dioxide.
- C Sulfur trioxide dissolves in sulfuric acid to form oleum.
- D The temperature used is around 450 °C.

7. One step in the manufacture of sulfuric acid is the oxidation of sulfur dioxide to sulfur trioxide.

Which conditions are used for this step?

	temperature /°C	pressure /atmospheres	catalyst
A	450	1.5	iron
B	450	1.5	vanadium(V) oxide
C	450	200	iron
D	450	200	vanadium(V) oxide

8. Which statement describes a disadvantage of sulfur dioxide?

- A It can be used as a bleach in making wood pulp.
- B It can be used to kill bacteria in food.
- C It can be used to manufacture sulfuric acid.
- D It can dissolve the limestone in statues.

9. What is a property of concentrated sulfuric acid but **not** of dilute sulfuric acid?

- A** It is a dehydrating agent.
- B** It neutralises alkalis.
- C** It produces a white precipitate with barium nitrate.
- D** It reacts with metals to give a salt and hydrogen.

10. Which row shows the conditions for the manufacture of sulfuric acid?

	pressure / atm	temperature / °C	catalyst
A	2	450	vanadium(V) oxide
B	2	250	iron
C	200	450	iron
D	200	250	vanadium(V) oxide

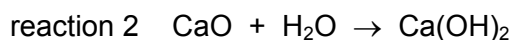
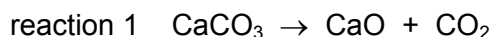
11. Which row shows the conditions used in the manufacture of sulfuric acid by the Contact process?

	temperature / °C	pressure / atm	catalyst
A	40	200	Fe
B	40	200	V ₂ O ₅
C	400	2	Fe
D	400	2	V ₂ O ₅

12 Which statement about sulfuric acid is correct?

- A It is made by the Haber process.
- B It is made in the atmosphere by the action of lightning.
- C It reacts with ammonia to produce a fertiliser.
- D It reacts with copper metal to produce hydrogen gas.

13 Two equations are shown.



Which terms describe reactions 1 and 2?

	reaction 1	reaction 2
A	reduction	hydration
B	reduction	hydrolysis
C	thermal decomposition	hydration
D	thermal decomposition	hydrolysis

14 Which statements about sulfur dioxide are correct?

- 1 It dissolves in water to produce a solution with a pH less than pH 7.
- 2 It is used as a food preservative.
- 3 It changes potassium manganate(VII) from colourless to purple.
- 4 It is produced by the combustion of sulfur-containing fossil fuels.

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

15 Which substance produces sulfur dioxide when roasted in air?

- A bauxite
- B cryolite
- C hematite
- D zinc blende

16 The ions present in ammonium sulfate are formed from the products of the Contact and Haber processes.

Both of these processes involve the use of a catalyst.

Which row is correct?

	ion	formed from	process	catalyst
A	ammonium	ammonia	Contact	iron
B	ammonium	ammonia	Haber	vanadium(V) oxide
C	sulfate	sulfuric acid	Contact	vanadium(V) oxide
D	sulfate	sulfuric acid	Haber	iron