

Air

Question Paper 2

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| Level | IGCSE |
| Subject | Chemistry (0620/0971) |
| Exam Board | Cambridge International Examinations (CIE) |
| Topic | Air and Water |
| Sub-Topic | Air |
| Booklet | Question Paper 2 |

Time Allowed: 43 minutes

Score: /36

Percentage: /100

Grade Boundaries:

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

1. Which reaction involves oxidation?
 - A heating hydrated copper(II) sulfate in the air
 - B polymerisation of ethene
 - C rusting of iron
 - D thermal decomposition of calcium carbonate

2. Which is an air pollutant that affects a part of the body other than the lungs and blood system?
 - A lead compounds
 - B nitrogen
 - C oxides of nitrogen
 - D sulfur dioxide

3. Which reaction involves oxidation?
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5. A man blows up a balloon.

What is the approximate composition of his exhaled air in the balloon?

| | % composition | | |
|----------|----------------|--------|----------|
| | carbon dioxide | oxygen | nitrogen |
| A | 0.03 | 20 | 79 |
| B | 0.03 | 79 | 20 |
| C | 4 | 16 | 79 |
| D | 4 | 20 | 75 |

6. Four steel paper clips are treated as described before being placed in a beaker of water.

Which paper clip rusts most quickly?

- A** coated with grease
 - B** dipped in paint and allowed to dry
 - C** electroplated with zinc
 - D** washed with soap and rinsed
7. A piece of uncoated iron and three pieces of iron with various coatings were left exposed to the air.

Which piece of iron would rust?

- A** the painted piece
- B** the tin-coated piece
- C** the uncoated piece
- D** the zinc-coated piece

8. Sulfur dioxide, SO_2 , nitrogen dioxide, NO_2 , and carbon monoxide, CO , are air pollutants.

Which row correctly shows their major source?

| | motor car engines | power stations |
|----------|----------------------------|----------------------------|
| A | CO | NO_2, SO_2 |
| B | NO_2, CO | SO_2 |
| C | SO_2, NO_2 | CO |
| D | SO_2 | NO_2, CO |

9. 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

10. Which is a use of oxygen?

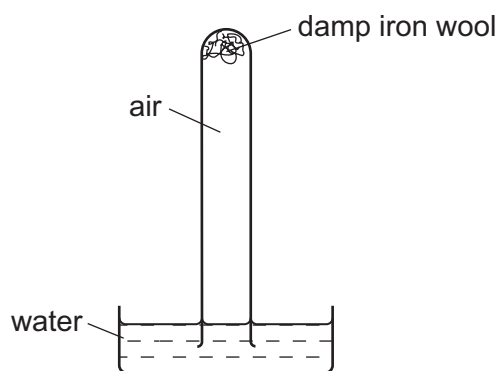
- A** as the gas in a lamp
- B** to react with ethene to form ethanol
- C** to react with methane in a Bunsen burner
- D** to react with hematite to form iron

11. Carbon monoxide is an air pollutant produced when petrol is burned in a car engine.

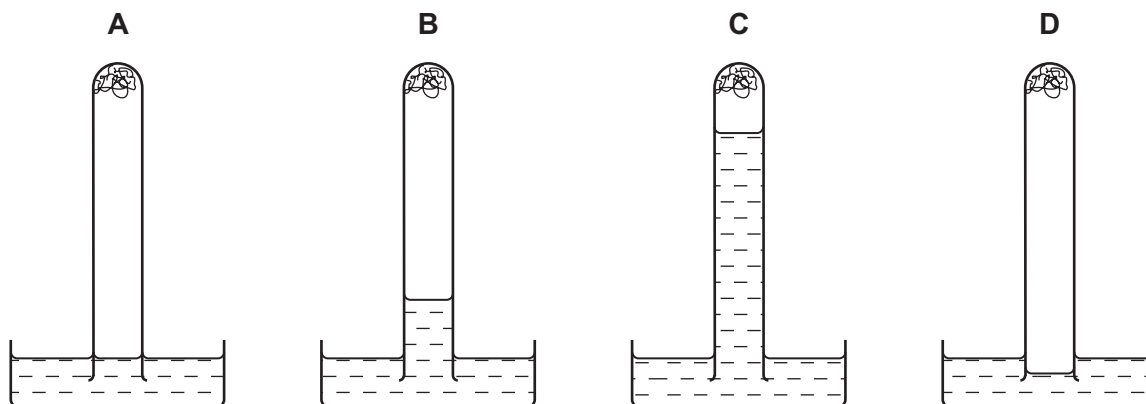
Why is carbon monoxide considered to be an air pollutant?

- A** It causes climate change.
- B** It causes the corrosion of buildings.
- C** It is a significant greenhouse gas.
- D** It is poisonous.

12. The apparatus shown is set up and left for a week.



Which diagram shows the level of the water at the end of the week?



13. Which gas is a pollutant of the air?

- A argon
- B carbon dioxide
- C nitrogen
- D sulfur dioxide

14. A farmer moves his cows into a concrete shelter for protection.

There is little access for fresh air once the door is closed.

Which gases would increase in amount in the shelter?

- A carbon dioxide and carbon monoxide
- B carbon dioxide and methane
- C carbon monoxide and oxygen
- D methane and oxygen

15. Which gas is **not** found in clean air?

- A carbon dioxide
- B carbon monoxide
- C nitrogen
- D oxygen

16. The pollutants released into the air from car exhausts and some power stations include oxides of the type XO and YO₂.

What are X and Y?

| | X | Y |
|----------|---------------------|-----------------------------|
| A | carbon only | nitrogen only |
| B | carbon only | nitrogen and sulfur only |
| C | carbon and nitrogen | carbon and nitrogen only |
| D | carbon and nitrogen | carbon, nitrogen and sulfur |

17. Which statement about rusting is **not** correct?

- A** Only oxygen is needed for rusting.
- B** Painting can stop iron gates rusting.
- C** Rust is hydrated iron(III) oxide.
- D** Water and oxygen are both needed for rusting.

18. Carbon monoxide is given out from the exhaust of vehicles that burn fossil fuels.

Which row shows why carbon monoxide is a pollutant?

| | acidic | toxic |
|----------|--------|-------|
| A | no | no |
| B | no | yes |
| C | yes | no |
| D | yes | yes |

19. A steel bicycle which had been left outdoors for several months was starting to rust.

What would **not** reduce the rate of corrosion?

- A Remove the rust and paint the bicycle.
- B Remove the rust and store the bicycle in a dry shed.
- C Remove the rust and wipe the bicycle with a clean damp cloth.
- D Remove the rust and wipe the bicycle with an oily cloth.

20. Oxygen is a reactive element.

Which row shows which of oxygen's reactions are useful?

| | fuel combustion | rusting | steel manufacture |
|---|-----------------|---------|-------------------|
| A | no | no | yes |
| B | no | yes | no |
| C | yes | no | yes |
| D | yes | yes | no |

21. Which method is **not** used for rust prevention?

- A coating working parts of industrial machinery with oil
- B covering wire for gardening use with plastic
- C immersing gardening tools in water for storage
- D painting car bodies

22. Which of these gases is an atmospheric pollutant?

- 1 carbon monoxide
- 2 nitrogen dioxide
- 3 sulfur dioxide

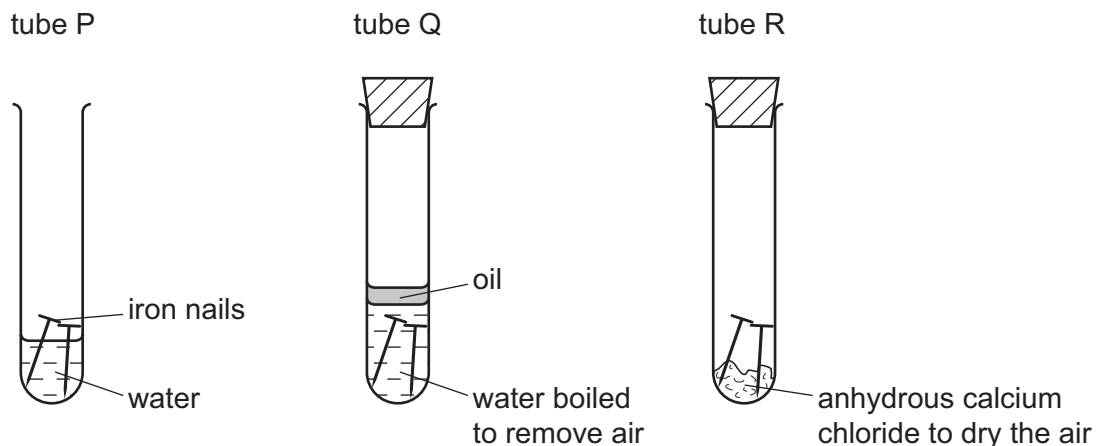
A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

23. A sample of air from a town centre was analysed and found to contain mainly nitrogen and oxygen, but also traces of the four gases below.

Which of these gases is a pollutant?

- A** argon
- B** carbon dioxide
- C** sulfur dioxide
- D** water vapour

24. The diagram shows experiments involving the rusting of iron.



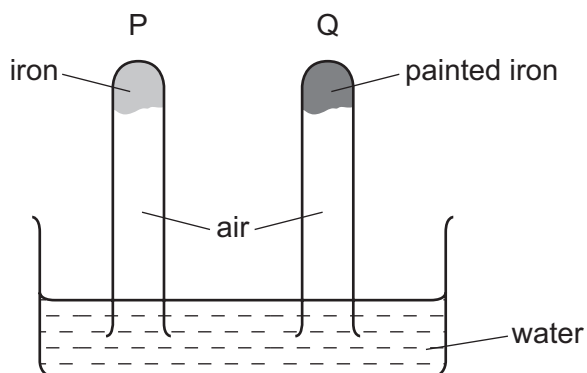
The following results were suggested.

- 1 In tube P, the iron nails rust.
- 2 In tube Q, the iron nails do not rust.
- 3 In tube R, the iron nails do not rust.

Which results are correct?

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

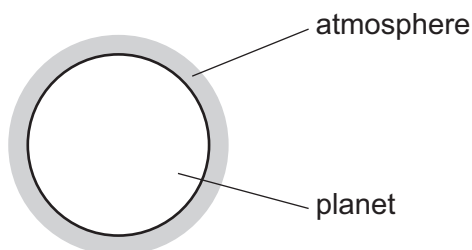
25. The diagram shows an experiment to investigate how paint affects the rusting of iron.



What happens to the water level in tubes P and Q?

| | tube P | tube Q |
|----------|-----------|-----------|
| A | falls | rises |
| B | no change | rises |
| C | rises | falls |
| D | rises | no change |

26. A new planet has been discovered and its atmosphere has been analysed.



The table shows the composition of its atmosphere.

| gas | percentage by volume |
|----------------|----------------------|
| carbon dioxide | 4 |
| nitrogen | 72 |
| oxygen | 24 |

Which gases are present in the atmosphere of the planet in a higher percentage than they are in the Earth's atmosphere?

- A** carbon dioxide and oxygen
- B** carbon dioxide only
- C** nitrogen and oxygen
- D** nitrogen only

27. Which pollutant found in air does **not** have an effect on respiration?

- A carbon monoxide
- B lead compounds
- C oxides of nitrogen
- D sulfur dioxide

28. Sulfur dioxide, carbon monoxide and oxides of nitrogen are common gaseous pollutants found in the air.

Which pollutants contribute to acid rain?

- A carbon monoxide and sulfur dioxide
- B oxides of nitrogen and sulfur dioxide
- C oxides of nitrogen only
- D sulfur dioxide only

29. The following substances can be formed when petrol is burnt in a car engine.

Which substance is the main cause of acid rain?

- A carbon
- B carbon monoxide
- C nitrogen dioxide
- D water

30. Many car exhaust systems contain a catalytic converter.

Which change does **not** occur in a catalytic converter?

- A carbon dioxide → carbon
- B carbon monoxide → carbon dioxide
- C nitrogen oxides → nitrogen
- D unburnt hydrocarbons → carbon dioxide and water

31. The gases coming from a car's engine contain oxides of nitrogen.

How are these oxides formed?

- A Nitrogen reacts with carbon dioxide.
- B Nitrogen reacts with carbon monoxide.
- C Nitrogen reacts with oxygen.
- D Nitrogen reacts with petrol.

32. Catalytic converters are used to remove some gaseous pollutants from car exhaust fumes.

Which gas is removed from the fumes by oxidation?

- A carbon dioxide
- B carbon monoxide
- C nitrogen
- D nitrogen oxide

33. Pure air contains nitrogen, oxygen and small amounts of other gases. The noble gases have been left out of the table.

Which row shows the composition of dry, unpolluted air?

| | nitrogen / % | oxyge / % | other gases |
|----------|--------------|-----------|---------------------------------|
| A | 21 | 78 | small amount of carbon dioxide |
| B | 21 | 78 | small amount of carbon monoxide |
| C | 78 | 21 | small amount of carbon dioxide |
| D | 78 | 21 | small amount of carbon monoxide |

34. Which pollutant gas can be produced as a result of incomplete combustion of octane, C_8H_{18} ?

- A carbon
- B carbon dioxide
- C carbon monoxide
- D methane

35. One method of preventing the rusting of iron is to keep oxygen away from the surface of the metal.

Which way of rust prevention does **not** use this method?

- A coating the iron with grease
- B connecting the iron to a more reactive metal
- C covering the iron with plastic
- D painting the iron

36. Nitrogen monoxide is produced in a car engine when petrol is burnt.

The gases from the car engine are passed through a catalytic converter.

In the catalytic converter the nitrogen monoxide reacts with carbon monoxide to form nitrogen and carbon dioxide.

Which statement is **not** correct?

- A Carbon monoxide is oxidised in the catalytic converter.
- B Carbon monoxide is produced by the complete combustion of petrol.
- C Nitrogen monoxide is formed by the reaction of nitrogen and oxygen.
- D Nitrogen monoxide is reduced in the catalytic converter.