

Air

Question Paper

Level	O Level
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	Atmosphere and Environment
Sub-Topic	Air
Booklet	Question Paper

Time Allowed: 37 minutes

Score: /31

Percentage: /100

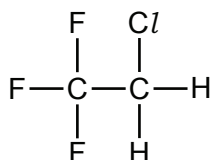
- 1 The table shows the composition of exhaust gases from an internal combustion engine.

gas	% of the gas in the exhaust fumes
gas Y	71
carbon dioxide	14
water vapour	13
carbon monoxide	1
hydrocarbons	0.3
nitrogen oxides	0.2
sulfur dioxide	less than 0.003

What is gas Y?

- A ammonia
 - B argon
 - C chlorine
 - D nitrogen
- 2 Which two gases do **not** damage limestone buildings?
- A nitrogen and carbon monoxide
 - B nitrogen dioxide and carbon monoxide
 - C nitrogen dioxide and carbon dioxide
 - D sulfur dioxide and carbon dioxide
- 3 What are the products of photosynthesis?
- A carbon dioxide and oxygen
 - B carbon dioxide and water
 - C glucose and water
 - D glucose and oxygen

- 4 When a volcano erupts, which gas is produced in significant amounts?
- A carbon monoxide
 - B methane
 - C ozone
 - D sulfur dioxide
- 5 Which atmospheric pollutant is produced by bacterial decay of vegetable matter?
- A carbon monoxide
 - B methane
 - C ozone
 - D sulfur dioxide
- 6 CFC compounds were commonly used as aerosol propellants. The structure of one CFC compound is shown.



- Which element in this compound causes a depletion of ozone in the atmosphere?
- A carbon
 - B chlorine
 - C fluorine
 - D hydrogen
- 7 Which gas is most likely to react with limestone?
- A ammonia
 - B carbon monoxide
 - C methane
 - D sulfur dioxide

- 8 The noble gases, argon, helium, krypton and xenon, are present in air.
Which noble gas is present in the largest proportion?
- A argon
 - B helium
 - C krypton
 - D xenon
- 9 Which gas will react with ozone in the upper atmosphere of the Earth?
- A CF_2Cl_2 B CH_4 C CO_2 D SO_2
- 10 Which pair of gases could be removed from the atmosphere using calcium carbonate?
- A CO_2 and O_3
 - B CO and SO_2
 - C CH_4 and NO_2
 - D NO_2 and SO_2
- 11 Which gas **can** be removed from the exhaust gases of a petrol-powered car by its catalytic converter?
- A carbon monoxide
 - B carbon dioxide
 - C nitrogen
 - D steam

12 Which row shows both the correct source and the correct effect of the named pollutant?

	pollutant	source	effect
A	carbon monoxide	incomplete combustion of carbon-containing materials	global warming
B	oxides of nitrogen	decaying vegetable matter	global warming
C	ozone	photochemical reactions	acid rain
D	sulfur dioxide	volcanoes	acid rain

13 The gases coming from a car's exhaust 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.

14 Which gas **cannot** be removed from the exhaust gases of a petrol-powered car by its catalytic converter?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrocarbons
- D** nitrogen dioxide

15 Which gas burns in air to form only one product?

- A** ammonia
- B** carbon monoxide
- C** hydrogen chloride
- D** methane

16 Sulfur is burnt in air.

Which statement about this reaction is correct?

- A Sulfur is oxidised to sulfur trioxide.
- B The gas formed turns aqueous potassium dichromate(VI) from orange to green.
- C The reaction is reversible.
- D The reaction needs a catalyst.

17 A catalytic converter in a car exhaust system speeds up the change of pollutants into less harmful products.

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

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

18 Which natural process can cause nitrogen oxides to be formed in the atmosphere?

- A bacterial decay of plants
- B lightning activity
- C photosynthesis
- D respiration

19 Methane is a greenhouse gas.

Which process releases methane into the air?

- A combustion of petrol
- B decay of vegetable matter
- C photosynthesis
- D volcanic activity

20 Four current problems in our atmosphere are listed.

- 1 acid rain
- 2 depletion of the ozone layer
- 3 presence of greenhouse gases
- 4 incomplete combustion of carbon compounds

Which atmospheric pollutant is responsible for each problem?

- W chlorofluorocarbons
X sulfur dioxide
Y carbon monoxide
Z carbon dioxide

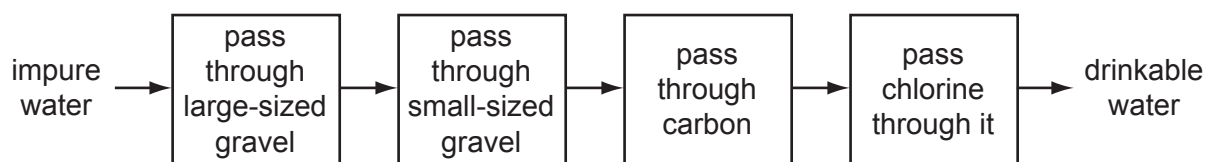
	1	2	3	4
A	W	X	Z	Y
B	X	W	Z	Y
C	X	Z	W	Y
D	Z	Y	X	W

21 Natural gas, petroleum and diesel are all used as energy sources.

Which gas is **not** produced when these sources are burned?

- A carbon dioxide
B carbon monoxide
C hydrogen
D water

22 The flow chart shows how impure water can be treated to produce drinkable water.



What is **not** removed from the water by this process?

- A clay particles
- B microbes
- C nitrates
- D odours

23 A solid substance Z burns in air to form a product that is gaseous at 20°C.

What is Z?

- A hydrogen
- B carbon monoxide
- C carbon
- D magnesium

24 Why are catalytic converters fitted to car exhausts?

- A to decrease the amount of carbon dioxide emitted
- B to decrease the amount of nitrogen oxides emitted
- C to improve energy conservation
- D to reduce global warming

25 The table shows pollutants and their possible effects.

Which line is **not** correct?

	pollutant	effect
A	CFCs	cause destruction of the ozone layer
B	CH ₄	forms photochemical smog
C	CO	is poisonous to humans
D	NO ₂	forms acid rain

26 Vegetable matter is biodegradable.

Which gas is released into the atmosphere when vegetable matter biodegrades?

- A** carbon monoxide
- B** methane
- C** nitrogen dioxide
- D** sulphur dioxide

27 To reduce atmospheric pollution, the waste gases from a coal-burning power station are passed through powdered calcium carbonate.

Which waste gas will **not** be removed by the powdered calcium carbonate?

- A** carbon monoxide, CO
- B** nitrogen dioxide, NO₂
- C** phosphorus(V) oxide, P₂O₅
- D** sulphur dioxide, SO₂

28 Which statements about the pollutant carbon monoxide are correct?

- 1 It is a colourless, odourless gas.
- 2 It is formed by incomplete combustion of natural gas.
- 3 It reacts with haemoglobin in the blood.

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

29 Which gas is **not** produced when hydrocarbons are burnt in the internal combustion engine?

- A** carbon dioxide
B carbon monoxide
C hydrogen
D nitrogen oxides

30 The data gives the concentration, in parts of pollutant per billion parts of air, of polluting gases in four different industrialised cities.

In which city are limestone buildings under greatest threat from pollution?

city	sulphur dioxide	nitrogen dioxide	ozone
A	17	46	23
B	32	33	30
C	38	40	11
D	45	14	21

- 31 Methane, sulphur dioxide and carbon dioxide are gases which affect the atmosphere and the environment.

In what way do these gases affect the environment?

	methane	sulphur dioxide	carbon dioxide
A	depletion of the ozone layer	acid rain	global warming
B	global warming	photochemical smog	acid rain
C	photochemical smog	global warming	depletion of the ozone layer
D	global warming	acid rain	global warming