Air and Water – 2023 IGCSE Chemistry 0620

1. Nov/2023/Paper_0620/11/No.28
Which test is used to show that a sample of water is pure?

A Evaporate the water to see if any solids remain.

B Heat the water to check its boiling point.

C Test with anhydrous cobalt(II) chloride.

D Use universal indicator paper to check its pH.

2. Nov/2023/Paper_0620/11/No.29
Which mixture of salts produces an NPK fertiliser?

A ammonium phosphate + potassium sulfate

B calcium phosphate + sodium nitrate

C potassium nitrate + calcium sulfate

D sodium phosphate + ammonium nitrate

3. Nov/2023/Paper_0620/11/No.30
What are the **main** products obtained by the fractional distillation of liquid air?

A carbon dioxide and oxygen

B carbon dioxide and water vapour

C nitrogen and oxygen

D nitrogen and water vapour

4. Nov/2023/Paper_0620/11/No.31
In which reaction is the rate of reaction increased by light?

A carbon dioxide + water → glucose + oxygen

B ethanoic acid + sodium carbonate → sodium ethanoate + water + carbon dioxide

C ethene + bromine → dibromoethane

D methane + oxygen → carbon dioxide + water

5. Nov/2023/Paper_0620/12/No.30
Which process removes carbon dioxide from the atmosphere?

A photosynthesis

B thermal decomposition of calcium carbonate

C combustion of fossil fuels

D reaction of sodium carbonate with an acid

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6. Nov/2023/Paper_0620/12/No.31

The flow chart shows stages in the treatment of river water to produce drinking water.

What occurs at stages J and K?

	J	K
A	distillation	chlorination
B	distillation	filtration
C	filtration	chlorination
D	filtration	distillation

7. Nov/2023/Paper_0620/12/No.32

Which two compounds can be mixed together to form an NPK fertiliser?

A ammonium phosphate and calcium hydroxide

B calcium phosphate and ammonium nitrate

C potassium nitrate and calcium oxide

D potassium phosphate and ammonium nitrate

8. Nov/2023/Paper_0620/12/No.33

What are the main substances produced by the fractional distillation of liquid air?

A oxygen and carbon dioxide

B oxygen and nitrogen

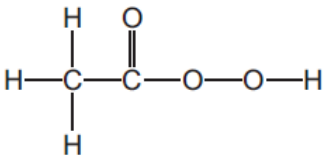
C helium and nitrogen

D hydrogen and oxygen

9. Nov/2023/Paper_0620/12/No.34

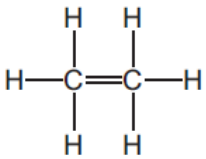
Which diagram shows the displayed formula for the named organic compound?

A



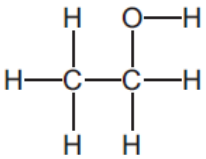
ethanoic acid

B



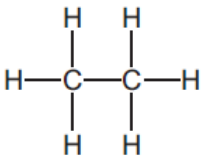
ethene

C



ethanol

D



methane

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10. Nov/2023/Paper_0620/13/No.30

Some uses of water are listed.

1 for drinking

2 in chemical reactions

3 in swimming pools

4 in washing

For which uses is it necessary to chlorinate the water?

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

11. Nov/2023/Paper_0620/13/No.31

Two tests are done on an NPK fertiliser.

test 1 flame test

test 2 heat with aqueous sodium hydroxide and aluminium foil

Which observations are made?

	test 1	test 2
A	green flame	gas evolved which turns red litmus blue
B	green flame	gas evolved which turns blue litmus red
C	lilac flame	gas evolved which turns red litmus blue
D	lilac flame	gas evolved which turns blue litmus red

12. Nov/2023/Paper_0620/13/No.32

The gases from the engine of a car 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.

13. Nov/2023/Paper_0620/13/No.33

Which statements explain why plastics should be recycled?

1 They do not decompose when added to land fill.

2 They pollute rivers and oceans, harming wildlife.

3 They can produce toxic gases when burned.

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

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14. Nov/2023/Paper_0620/13/No.34

Unwanted vegetation is sometimes placed in a bin where it decomposes. The compost formed is used to fertilise soils.

Which gas is likely to be present in a higher percentage inside the bin than in the air outside the bin?

A carbon monoxide

B methane

C oxygen

D sulfur dioxide

15. Nov/2023/Paper_0620/21/No.29

Which test is used to show that a sample of water is pure?

A Evaporate the water to see if any solids remain.

B Heat the water to check its boiling point.

C Test with anhydrous cobalt(II) chloride.

D Use universal indicator paper to check its pH.

16. Nov/2023/Paper_0620/21/No.30

Catalytic converters in car exhausts change polluting gases into non-polluting gases.

Which statements about oxides of nitrogen and car engines are correct?

1 The nitrogen in oxides of nitrogen comes from compounds in gasoline.

2 The oxygen in oxides of nitrogen comes from the air in the car engine.

3 Catalytic converters convert oxides of nitrogen into nitrogen.

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

17. Nov/2023/Paper_0620/22/No.30

The flow chart shows stages in the treatment of river water to produce drinking water.

What occurs at stages J and K?

	J	K
A	distillation	chlorination
B	distillation	filtration
C	filtration	chlorination
D	filtration	distillation

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18. Nov/2023/Paper_0620/22/No.31

Carbon dioxide acts as a greenhouse gas by interacting with a particular type of energy that radiates from the Earth's surface into the atmosphere.

Which type of energy is involved and what happens when this energy interacts with carbon dioxide molecules?

	type of energy involved	what happens
A	thermal	carbon dioxide molecules increase the Earth's energy loss to space
B	thermal	carbon dioxide molecules absorb the energy
C	light	carbon dioxide molecules increase the Earth's energy loss to space
D	light	carbon dioxide molecules absorb the energy

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19. Nov/2023/Paper_0620/22/No.32

Oxides of nitrogen, such as NO and NO_2, are formed in the petrol engines of cars.

They are removed from the exhaust gases by reactions in the car's catalytic converter.

Which row describes how oxides of nitrogen are formed in a petrol engine and a reaction that happens in the catalytic converter?

	how oxides of nitrogen are formed	a reaction that happens in the catalytic converter
A	by the reaction between nitrogen and oxygen from the air	$2NO + 2CO \rightarrow N_2 + 2CO_2$
B	by the reaction between nitrogen and oxygen from the air	$2NO + 2H_2 \rightarrow N_2 + 2H_2O$
C	by the reaction between nitrogen compounds in petrol and oxygen from the air	$2NO + 2CO \rightarrow N_2 + 2CO_2$
D	by the reaction between nitrogen compounds in petrol and oxygen from the air	$2NO + 2H_2 \rightarrow N_2 + 2H_2O$

20. Nov/2023/Paper_0620/23/No.31

Some uses of water are listed.

1 for drinking

2 in chemical reactions

3 in swimming pools

4 in washing

For which uses is it necessary to chlorinate the water?

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

21. Nov/2023/Paper_0620/23/No.32

Oxides of nitrogen are formed in car engines and are a source of air pollution.

To decrease this pollution, catalytic converters are fitted to car exhausts.

What happens to the oxides of nitrogen in the catalytic converter?

A combustion

B cracking

C oxidation

D reduction

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22. Nov/2023/Paper_0620/31/No.1(b, d)

A list of substances is shown.

ammonium nitrate
carbon monoxide
copper(II) chloride
ethane
ethene
litmus
methane
methyl orange
sodium chloride
sodium sulfate
sulfur dioxide
thymolphthalein

Answer the following questions using only the substances from the list.
Each substance may be used once, more than once or not at all.

Give the name of the substance that:

(b) is in many fertilisers

..... [1]

(d) is a waste gas from digestion in animals

..... [1]

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23. Nov/2023/Paper_0620/31/No.3(b)

(b) (i) State **one** source of sulfur dioxide in the atmosphere.

..... [1]

(ii) State **one** adverse effect of sulfur dioxide in the atmosphere.

..... [1]

24. Nov/2023/Paper_0620/32/No.1(b, e)

A list of compounds is shown.

ammonia
carbon dioxide
carbon monoxide
cobalt(II) chloride
ethane
ethene
glucose
methane
potassium sulfate
sodium phosphate
sulfur dioxide

Answer the following questions using only the compounds from the list.
Each compound may be used once, more than once or not at all.

Give the name of the compound that:

(b) leads to the deoxygenation of water in rivers

..... [1]

(e) is a product of photosynthesis

..... [1]

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(c) (i) Oxides of nitrogen contribute to acid rain.

Choose from the list the pH value for an acidic solution.

Draw a circle around your chosen answer.

pH 5 **pH 7** **pH 9** **pH 13** [1]

(ii) Complete the sentence about removing oxides of nitrogen from car exhausts by choosing **two** words from the list.

agent **catalytic** **compound** **converter**

distillation **filter** **oxidising** **pump**

The emission of oxides of nitrogen from car exhausts is reduced by using a

.... [1]

(iii) Oxides of nitrogen can be formed by the action of bacteria on nitrates.

Name the aqueous solution and the metal used in the test for nitrate ions.

aqueous solution .....

metal .....

[2]

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26. Nov/2023/Paper_0620/33/No.1(a, d, f)

A list of substances is shown.

ammonia
calcium oxide
carbon monoxide
cobalt(II) chloride
ethane
ethanol
ethene
oxygen
potassium oxide
sodium sulfate
sulfuric acid
water

Answer the following questions using only the substances from the list.
Each substance may be used once, more than once or not at all.

Give the name of the substance that:

(a) is a product of photosynthesis

..... [1]

(d) is used to remove sulfur dioxide in flue gas desulfurisation

..... [1]

(f) is used to test for water.

..... [1]

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27. Nov/2023/Paper_0620/33/No.3(b)

(b) (i) State **one** source of oxides of nitrogen in the air.

..... [1]

(ii) Oxides of nitrogen contribute to acid rain.

Give one **other** effect of oxides of nitrogen in the air.

..... [1]

(iii) Unpolluted water has a neutral pH.

Choose from the list the pH value of a neutral substance.

Draw a circle around your chosen answer.

pH 1 **pH 6** **pH 7** **pH 14** [1]

28. Nov/2023/Paper_0620/41/No.1(a, d)

A list of gases is shown.

ammonia
carbon dioxide
carbon monoxide
ethene
fluorine
oxygen
sulfur dioxide
xenon

Answer the following questions using only the gases from the list.
Each gas may be used once, more than once or not at all.

Give the name of the gas that:

(a) causes acid rain

..... [1]

(d) is a product of photosynthesis

..... [1]

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29. Nov/2023/Paper_0620/41/No.5(c)

(c) Methane is a greenhouse gas which contributes to global warming.

(i) Name a greenhouse gas found in clean, dry air.

..... [1]

(ii) Explain, in terms of thermal energy, how greenhouse gases cause global warming.

.....

.....

.....

.....

..... [3]

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30. Nov/2023/Paper_0620/43/No.1(f)

A list of substances is shown.

barium nitrate
carbon monoxide
hydrated cobalt(II) chloride
copper(II) oxide
anhydrous copper(II) sulfate
ethane
potassium iodide
propene
sodium bromide
sulfur dioxide
zinc oxide

Answer the following questions using only the substances from the list.
Each substance may be used once, more than once or not at all.

Give the name of the substance that:

(f) is used to test for the presence of water.

..... [1]