AQA GCSE CHEMISTRY (HIGHER) · 8462

CHEMISTRY



MARK SCHEME

4.9.3 COMMON ATMOSPHERIC POLLUTANTS AND THEIR SOURCES (PACK 2)

SCORE	PERCENTAGE
/68	%

STEMUP

These questions belong to AQA, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by AQA. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with AQA and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. AQA has not endorsed, approved or been involved in the production of it. AQA and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

AQA publishes its past papers, mark schemes and examiner reports. Always check the current specification at aqa.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Q1.

(a) (i) $Cu_2S + 2O_2$ ® $2CuO + SO_2$

accept fractions and multiple

1

(ii) any **two** from:

- sulfur dioxide

  accept sulphur dioxide / sulphur oxide / SO_2

- causes acid rain

  ignore other comments eg global warming / ozone / global dimming / greenhouse effect

- consequence of acid rain eg kills fish / plants

2

(b) any **two** from:

- heat (copper oxide with carbon)
- oxygen is removed by carbon

  accept copper (oxide) loses oxygen

  or

  carbon gains oxygen

  accept carbon oxide

  or

  carbon monoxide / carbon dioxide is produced

  or

  carbon displaces copper

  accept a correct word or balanced symbol equation

- because carbon is more reactive than copper

  allow a correct comparison of reactivity

2

(c) (i) electrolysis

accept electroplating

1

(ii) (electrical) wiring / appliances / coins / pipes / cladding for buildings / jewellery / <u>making</u> alloys

1

or

named alloys

STEMUP.CO.UK

(d) any **three** explanations from:

<u>for recycling</u>

- less acid rain (pollution)
- copper reserves last longer / conserved

  or

  do not run out
- energy for extraction (saved)

  or

  less energy required
- less mining / quarrying
- less waste (copper) / electrical appliances dumped

  or

  less landfill

  <u>against recycling</u>
- collection problems
- transport problems
- difficult to separate copper from appliances
- energy used to melt the collected copper

  ignore electrolysis / pollution
  ignore ideas about less machinery / plant
  ignore idea of cost

3

[10]

Q2.

Quality of written communication:

*for correct sequencing or linking of **two** ideas or **two** points*
annotate Q ✓ or Q ✗

1

any **three** from:

ignore superfluous statements

- **B** is least energy efficient in terms of cost (kJ per p), so **A** = **C** = **D** in terms of cost **or B** is the most expensive in terms of energy efficiency
  owtte

STEMUP.CO.UK

*accept **B** is poor value for money / **B** is most expensive*
one is insufficient for mark

- **D** is 1st, since gives only water as product **or** gives no harmful products / gases **or** there are no pollutants
owtte

- **A** is 2nd best, since produces CO_2 owtte

- **C** is 3rd, since gives SO_2 owtte

*if no other marks, then **D A C B** – based on energy per kJ per 100g only = **1** mark and Q mark if 2 ideas are linked*

3

[4]

Q3.

(a) hydrocarbon is a compound

***not** mixture **not** substance*

1

containing carbon and hydrogen

accept of the elements carbon and hydrogen
accept of carbon and hydrogen
contains hydrogen and carbon only (2)

1

(b) (i) any order

carbon dioxide

accept CO_2
***exact** formulae*

2

water 1

accept H_2O
***not** carbon in one box and dioxide in second box (0)*
ignore any attempt to 'balance' the equation

(ii) it is poisonous

accept toxic
can kill you
accept any reasonable description
*of its effect on red blood cells **or** on*
haemoglobin in terms of reducing
oxygen transport
***not** can explode, harmful,*
dangerous, flammable

1

[5]

Q4.

STEMUP.CO.UK

(a) organic

1

sediment

1

(b) (i) gases

1

(ii) bitumen

1

(c) (i) cracking

accept thermal decomposition

*do **not** accept endothermic*

1

(ii) many **or** short **or** small (ethene) molecules

accept monomer

*accept double bonds open up **or** break*

1

join to make larger molecules

accept polymer

accept polymerisation

*accept short chain to long chain (**or** molecules)*

*do **not** accept unsaturated to saturated*

1

(d) poor ventilation

accept limited air supply

accept insufficient oxygen

1

causes incomplete combustion

accept produces CO

1

(fumes contain) carbon monoxide which dangerous

*toxic is **not** awarded a mark*

*do **not** accept harmful or poisonous*

1

[10]

Q5.

(a) combustion

for one mark

1

(b) B

for one mark

1

[2]

STEMUP.CO.UK

Q6.

(a) (i) fractional distillation

both words required

accept fractionation

1

(ii) any **one** from

ethane

propane

butane

1

(b) (i) carbon dioxide

1

water (vapour)

accept steam

do not credit symbols

1

(ii) carbon monoxide

accept CO

*do not credit soot **or** carbon oxide*

1

[5]

Q7.

(a) substances/chemicals/compounds

gains 1 mark

but gases (accept vapours)

gains 2 marks

heat (accept light)

for 1 mark

3

(b) carbon dioxide/CO_2
water (vapour)/H_2O
sulphur dioxide/SO_2
(<u>accept correct formulae</u>)

in any <u>order</u> for 1 mark each

3

[6]

Q8.

(a) (i) oxygen (not air)

(ii) oxides/monoxides/dioxides

for 1 mark each

STEMUP.CO.UK

Do not allow specific examples

2

(b) (i) water

(ii) sulphur

(iii) carbon

for 1 mark each

3

(c) gives out/releases heat/energy

for 1 mark

1

(d) (i) carbon dioxide

(ii) carbon

for 1 mark each

(allow correct symbols/formulae)

2

[8]

Q9.

(a) each bar correct height (2 bars) to less than ± ½ square

1 mark for each

both bars correctly labelled (in relation to size of bars)

for 1 mark

3

(b) less

gains 1 mark

but a lot less / much less / 18 times less or more if referring to coal

gains 2 marks

2

(c) (i) carbon
sulphur

for 1 mark each

2

(ii) *ideas that*

- at high temperatures, (produced when fuels burn)
- nitrogen and oxygen from atmosphere combine / react

for 1 mark each

2

[9]

Q10.

STEMUP.CO.UK

(a) both bars correct height (to better than half a square)

1 mark for both

both bars correctly labelled
(w.r.t. relative heights if these incorrect)

for 1 mark

2

(b) a lot less / much less / 18 times less (converse must specify coal)

gains 1 mark

1

(c) *ideas that*

- at high temperatures (produced when fuels burn)
- nitrogen and oxygen from air / atmosphere combine / react
  or nitrogen from air / atmosphere oxidises

for 1 mark each

2

(d) *ideas that*

- coal produces most carbon dioxide / more CO_2 than gas / oil
- because coal is (mostly) carbon
- gas produces less carbon dioxide than coal / oil
- oil and gas also contain hydrogen / contain more hydrogen atoms than carbon atoms / also produce water

any three for 1 mark each

3

(e) sulphur

for 1 mark

2

[9]

STEMUP.CO.UK