

MARK SCHEME

GCSE

CHEMISTRY

AQA - TRIPLE SCIENCE

C10 - TEST 5
USING RESOURCES
Advanced

Mark schemes

1.

- (a) (i) many ethene / molecules / monomers
accept double bonds open / break
accept addition polymerisation

1

join to form a long hydrocarbon / chain / large molecule
ignore references to ethane
correct equation gains 2 marks

1

- (ii) (can be deformed but) return to their original shape (when heated or cooled)
ignore 'it remembers its shape'

1

- (iii) cross links / extra bonds in PEX
it = PEX throughout
accept inter-molecular bonds
ignore inter-molecular forces

1

molecules / chains in PEX are held in position
accept rigid structure

1

molecules / chains in PEX unable to slide past each other / move

1

(b) any **four** from:

ignore costs / sustainability / non-renewable

- less (hydrocarbon) fuels used
allow less energy
- less / no electrical energy used
allow no electrolysis
- reduce carbon / carbon dioxide emissions
allow less global warming
- reduce / no pollution by sulfur dioxide / acid rain
allow less / no transportation
- continuous process
- conserve copper which is running out or only low-grade ores available
allow less waste
- reduce the amount of solid waste rock that needs to be disposed
allow less mining
- reduce the need to dig large holes (to extract copper ores)

4

[10]

2.

(a) The ore is not pure or contains impurities or the ore does not contain 100% of the metal compound

allow to concentrate the metal or metal compound

1

rock / other compounds need to be removed / separated

1

(b) (i) (cast iron is) brittle

allow not strong

ignore weak

1

(ii) the oxygen reacts with carbon

allow carbon burns in oxygen or is oxidised

1

reducing the percentage of carbon in the mixture
or producing carbon dioxide

1

- (c) (i) aluminium has a low density 1
- (ii) (because copper) is in the central / middle (block of the periodic table) 1
- whereas aluminium is in Group 3 (of the periodic table) 1
- (iii) iron is more reactive (than copper) 1
- ignore cost*
- so copper is displaced / reduced 1
- [10]**
- 3.** (a) has delocalised electrons 1
- accept free (moving) electrons*
- (so electrons) can move through the structure/metal 1
- accept (so electrons) can carry charge through the structure/metal*
- accept (so electrons) can form a current*
- reference to incorrect particles or incorrect bonding or incorrect structure = max 1*
- (b) giant structure 1
- accept lattice*
- accept each atom forms four bonds (with other carbon atoms)*
- ignore macromolecular*
- strong bonds 1
- accept covalent*
- do not accept ionic*
- reference to intermolecular forces/bonds or incorrect particles = max 1*
- (c) thermosetting polymers do not melt (when heated) 1
- accept thermosetting polymers do not change shape (when heated)*
- accept thermosetting polymers have high(er) melting points*
- ignore thermosetting polymers do not soften (when heated)*

due to cross-links (between chains)

accept due to bonds between chains

reference to smart polymers = max 1

accept converse argument

1

[6]

4.

Reused

- saves raw materials / crude oil
 - *unable to reuse many times*
 - *bags easily split*
- saves energy / fuel / transport
- fewer bags needed / made
- reduces carbon / CO₂ emissions
- reduces use of landfill
- saves cost of a new bag
- no waste

1

Recycled

- saves raw materials / crude oil
 - *has to be collected / transported / washed / separated / melted*
- saves energy / use of fuel
- reduces carbon / CO₂ emissions
- reduces use of landfill
- can be used for new products
 - *ignore uses energy*

1

Burned

- heat / energy released can be used (for heating / generating electricity)
 - *has to be collected / transported*
- reduces use of landfill
 - *wastes the resource / plastic*
 - *releases harmful gases / toxic gases / CO₂*

1

Dumped

- collected / transported with household waste
 - *wastes the resource*
 - *plastic uses landfill*
- (slowly) biodegrades **or** produces methane which can be used as a fuel
 - *produces methane which is a greenhouse gas / could cause explosions*
- (not biodegradable so) does not release CO₂ / green house gas into the air
 - *not biodegradable / take years to decompose*

ignore cost / litter / waste / global warming / habitats unless mentioned above

1

[4]

5.

- (a) because atoms / ions / particles in alloy are different (sizes)

*do **not** allow reference to molecules*

ignore reference to compounds

1

so layers distorted

(and layers / atoms / ions / particles) don't slide **or** slide less easily

accept all marking points in a suitably labelled or annotated diagram

1

*if no other mark awarded accept an alloy is a mixture **or** contains different metals / elements for 1 mark*

1

- (b) giant structure **or** lattice **or** macromolecule

max 3 marks if incorrect bonding

1

strong bonds (between carbon / atoms)

1

covalent (bonds)

1

each carbon / atom forms 4 bonds

accept tetrahedral

if no other marks awarded, allow carbon (atoms) for 1 mark

1

- (c) *reference to incorrect bonding = max 3*
reference to 'weak covalent bonds' = max 2
allow correctly drawn diagram for first two marking points eg.
(tangled) lines with no cross-links

chains **or** large molecules
ignore layers

1

with intermolecular forces **or** forces between chains
allow bonds for forces accept no cross-links

1

that are weak
must relate to 2nd marking point

1

and are easily overcome/ broken (when heated)
accept molecules / chains can flow / move

1

[11]