

MARK SCHEME

GCSE

CHEMISTRY

AQA - TRIPLE SCIENCE

C2 - TEST 1

BONDING

Beginner

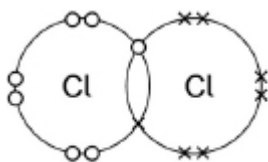
Mark schemes

1.

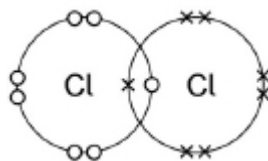
- (a) **A** 1
- (b) **D** 1
- (c) **C** 1
- (d) **E** 1
- (e) bonding pair of electrons drawn

electrons can be dots, crosses or e^{-} in any combination

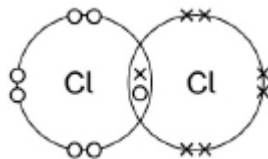
eg



or



or



*do **not** accept if electrons added to outer shells outside overlap*

- (f) weak forces between molecules 1
- (g) MnO 1
- (h) ions move around in the liquid 1

[8]

2.

- (a) tin 1
- (b) 70 (%) 1

(c) $\frac{90}{100} \times 1100$

= 990 (g)

1

(d) mixture of metals

1

(e) (red brass) contains more copper
allow converse

1

1

(so) layers slide more easily

or

layers are less distorted

1

(f) 24

1

[8]

3.

(a) a layer a few hundred atoms thick

1

(b) any **two** from:

any two ideas

- less materials or save resources
- less energy
- less fuel
- less pollution / greenhouse effect / global warming
- less waste

ignore references to cost / recycling

2

[3]

4.

(a) (i) In suntan creams

1

(ii) Much smaller

1

(b) (i) have a high surface area to volume ratio

1

(ii) because a catalyst provides an alternative / different pathway / mechanism / reaction route

accept adsorption or 'increases concentration at the surface' ignore absorption

1

(that has) lower activation energy

allow weakens bonds

allow idea of increased successful collisions

max 1 mark for incorrect chemistry eg increased energy of particles

1

[5]

5.

(a) layers

which have weak forces / attractions / bonds between them

second mark must be linked to layers

1

or

which can slide over each other **or** separate

ignore references to rubbing

1

(b) covalent

1

[3]

6.

(a) (i) two

1

(ii) a molecule

1

(iii) one pair of electrons between nitrogen and each of 3 hydrogens

1

rest correct

second mark dependent on first

1

(b) (i) (g) (s)

1

(ii) chloride

ignore formulae

1

(c) (i) any **one** from:

- wear goggles
- wear gloves
- do not breathe in fumes
- wipe up spills immediately
- work in a fume cupboard

1

(ii) (particles of) ammonia move faster than (particles of) hydrogen chloride

allow diffuses faster

allow hydrochloric acid

1

(iii) particles / molecules have more energy

*do **not** accept atoms / ions*

1

so they move faster

ignore references to rate of reaction

1

[10]

7.

(a) (i) Filtration

1

(ii) Chlorine

1

(b) (i) nanoparticles are small / smaller / much smaller / tiny

*allow any in range 1–100 nm or $1 \times 10^{-9} \text{ m} - 1 \times 10^{-7} \text{ m}$ **or** a few hundred atoms in size*

ignore numbers if stated smaller

1

(ii) they have a high surface area to volume ratio

reference to surface area without volume ratio is insufficient

*allow nanoparticles are very reactive **or** nanoparticles are more reactive than normal particles.*

1

(c) (sodium hydroxide) produces a white precipitate

accept solid / suspension or ppt or ppte for precipitate.

ignore cloudy / milky

1

which (then) dissolves / disappears (in excess sodium hydroxide)

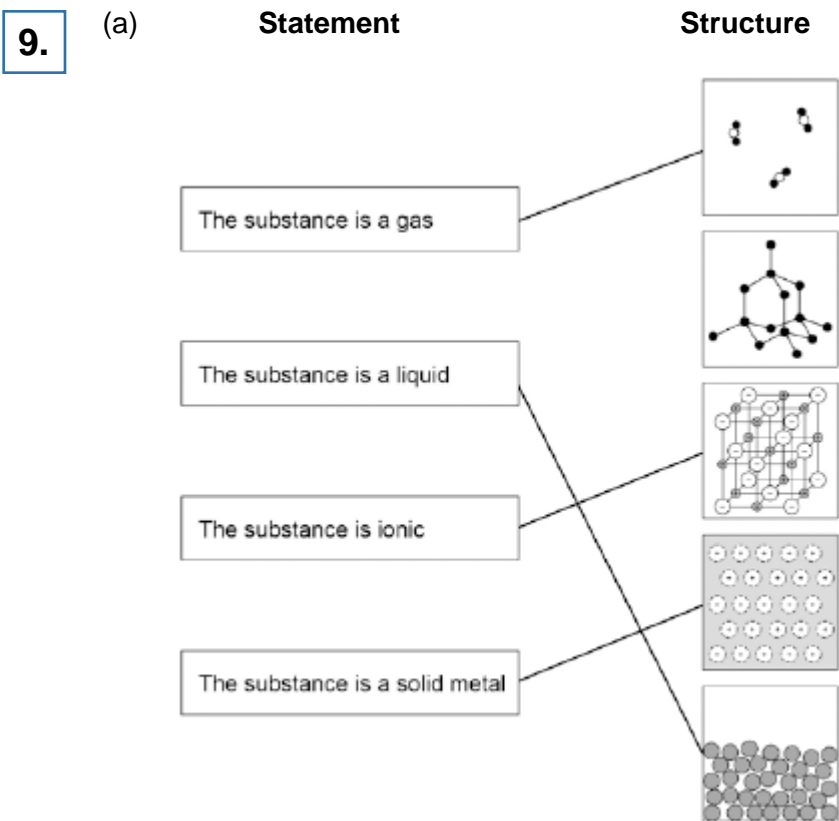
M2 cannot be awarded unless a solid of some sort has been made

ignore names or formulae of compounds

1

[6]

8. (a) (i) C 1
(ii) B 1
(iii) A 1
(iv) D 1
(b) (i) SO₂ 1
(ii) shared 1
(iii) covalent 1
- [7]



more than one line drawn from a variable negates the mark

- (b) Carbon 4
1
(c) It has delocalised electrons 1

(d) the atoms / particles / ions are different sizes
do not accept molecules 1

so there are no rows / layers to slide
accept the layers are disrupted 1

(e) $\frac{2}{27} \times 100$ 1

7.4% 1

allow 7.4% with no working shown for 2 marks

(f) Mixture 1

[11]

10.

(a) 50 1

(b) 5% 1

(c) any **two** from:

- cost (9 carat is cheaper)
- pure gold is soft
or
24 carat gold is soft
or
9 carat gold is harder
allow 9 carat gold is stronger
allow gold is an alloy in 9 carat gold
- can change the colour

2

[4]

11.

(a) (i) hard
ignore strong 1

(ii) hundred 1

(b) (i) Covalent 1

(ii) 3 1

(iii) Soft and slippery 1

- (c) (i) cross-links
allow bonds
ignore links
*do **not** accept intermolecular* 1
- (ii) melt 1
- (iii) any **two** from:
• temperature
allow heat(ing)
• pressure
• catalyst 2
- (d) (i) CH₄ 1
- (ii) Small molecules 1
- [11]**