

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C4 - TEST 6

CHEMICAL CHANGES

Advanced

Mark schemes

- 1.** (a) Gas A = Chlorine / Cl_2 not Cl and Gas B = Hydrogen / H_2 not H
for 1 mark
- Solution C = sodium hydroxide/NaOH/spent brine
for 1 mark
- (b) (i) 2, 2
for 1 mark
- (ii) 2, 2
for 1 mark
- (c) water/ H_2O /hydrogen oxide not hydrogen hydroxide
for 1 mark
- (d) ions/positive ions/negative ions/cations/anions
not charged particles/positive particles/negative particles
not H^+ / Cl^- / Na^+ / OH^-
Allow hydrogen ions etc.
not sulphate ions
for 1 mark
- 2.** (a) (i) iron **must** be named
do not accept Fe
- (ii) hydrogen
- and oxygen mixtures
- burn rapidly
- (b) (i) lowers concentration
accept dilutes the acid
do not accept cooling
- less collisions (between particles)

[6]

(ii) H^+ (aq)
accept H_3O^+ only if 2 in front of H_2O 1

OH^- (aq)
if spectator ions correctly included on both sides, maximum = 1 mark 1

(iii) $Ca(OH)_2$ weak alkali
accept NaOH strong alkali 1

$Ca(OH)_2$ causes no problems
*accept NaOH causes named problem (eg caustic **or** exothermic **or** burns **or** corrosive)* 1

[10]

3.

(a) sodium hydroxide / caustic soda / NaOH
for 1 mark 1

(b) negative ions move to the positive electrode etc.
/because it is negative
/opposite charges attract
for 1 mark 1

(c) loss of electrons
for 1 mark 1

[3]

4.

(a) any **two** from:

- outer shell electrons / electrons in highest energy level (in metals)
- electrons are delocalised / sea of electrons
- electrons are free **or** electrons move around **or** electrons are free to flow **or** electrons attracted to positive terminal
- electrons carry charge / current **or** electrons form the current / electrons transfer charge / electrons pass charge

ignore electrons carry electricity

ignore reference to positively charged atoms / ions

if they state electrons have +ve charge = max 1 mark

if they state covalent bonding then max 1 mark

2

(b) ions can move / are attracted to electrode

accept ions are free

allow 'they' for ions

or

attracted to named electrode

or

ions are charged **or** ions form / carry the current **or** ions form the charge

1

(c) (i) electron gain

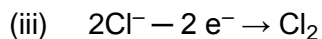
ignore hydrogen reduces charge

1

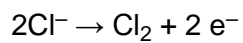
(ii) sodium hydroxide **or** NaOH **or** caustic soda

*do **not** allow hydroxide alone*

1



or



*allow fractions **or** multiples*

*allow e **or** e⁻*

*do **not** allow e⁺*

1

[6]

5.

(a) (2) : (6) : (2)

All 3 correct gains 2 marks

2 correct gains 1 mark

2

(b) no water present/moist air cannot enter/do not thoroughly mix/
must be in solution etc.

for 1 mark

1

(c) (i) hydroxide (ion) / OH⁻

for 1 mark

1

(ii) hydrogen (ion) / H⁺

for 1 mark

1

(iii) water/H₂O/hydrogen oxide

for 1 mark

1

[6]

6. (i) hydrogen, hydroxide and sulphate
*all **three** and no others*
any order
do not credit any formula(e) 1
- (ii) the anode is positive 1
- (so) only the negative ions are attracted to it
or (so) only the hydroxide ions and the sulphate ions are attracted (to it)
or (so) only the anions are attracted (to it) 1
- (iii) $2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}^-$ 1

[4]

7. (a) (i) $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O} / \text{H}_3\text{O}^+ + \text{OH}^- \rightarrow 2\text{H}_2\text{O}$
for 1 mark 1
- (ii) 1 point from e.g.
 smaller bits
 bigger surface area
 faster reaction
 dissolve faster
 more particles open to attack by acid
any 1 for 1 mark 1
- (iii) MgCO_3 or $\text{Mg}^{2+}\text{CO}_3^{2-}$ or CO_3Mg
for 1 mark 1
- (b) (i) 2 HCl
for 1 mark 1
- (ii) aqueous/dissolved in water (not in solution)
for 1 mark 1
- (iii) CO_2 /gas evolved/gas has mass
for 1 mark 1

- (c) (i) plotting points
scales
curve
labelling axes including units
for 1 mark each

4

- (d) faster
same final mass
for 1 mark each

2

[12]

8.

- (a) unreactive / near bottom of reactivity series

1

- (b) carbon more reactive / higher up reactivity series

1

- (c) very reactive / near top of reactivity series

1

cannot use displacement methods / can only be extracted by electrolysis / had to wait discovery of electricity

1

[4]

9.

- (a) electrolytes

1

- (b) oxidation

1

electrons lost

1

- (c) $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$

minus sign on e^- not needed

2

- (d) concentration increases

1

OH^- discharged from water / water decomposes

1

H^+ concentration increases / H_2 and O_2 evolved

1

[8]