

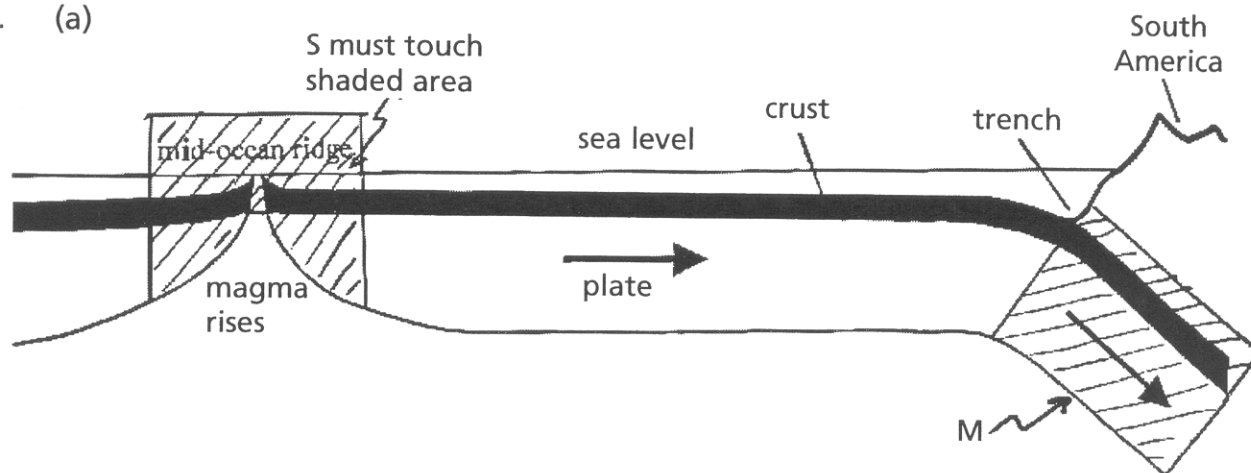
Syllabus 1036

Science: Chemistry

Paper 3H

MARK SCHEME - Summer 2000

1. (a)



- (i) correct position of **S**; 1
- (ii) correct position of **M**; 1

- (b) A description to include three from:
1. sediment formed/transportation;
[Reject dead animals]
 2. (particles) fall to sea bed/deposition/ layers form;
 3. compressed/'cement' together;
 4. over time/millions/thousands of years/many years;
- 3
- [Reject thousand or less years]

Total 5 marks

2. (a) (i) calcium carbonate + hydrochloric acid
 \rightarrow calcium chloride + carbon dioxide + water
calcium chloride is produced;
completely correct equation; 2
- (ii) A description to include:
1. bubble/eq;
 2. (the gas through) limewater;
 3. limewater turns cloudy;
- 3
- [Reject lighted splint extinguished]

- (b) (i) mass decreases; 1
- (ii) An explanation to include two from:
 1. (carbon dioxide) gas;
 2. evolves/given off/escapes (from the flask); 2
- (iii) 233(g); 1
- (c) faster reaction; 1
- (d) Any three from:
 1. more concentrated acid/lower pH;
 [Reject stronger acid]
 2. higher temperature/heat;
 3. add a catalyst;
 4. stir/shake; 3
 [Reject add more powder]

Total 13 marks

3. (a) (i) bauxite; 1
- (ii) electrolysis; 1
 [Reject reduction]
- (b) (i) heat/energy taken in/eq; 1
 [Reject gets colder]
- (ii) (strong) bonds have to be broken; 1

(c)

Formula of particle	Number of protons	Number of neutrons	Number of electrons
Al	13	14	13
Al ³⁺	13	14	10

- six correct - 4 marks 4
 five correct - 3 marks
 four correct - 2 marks
 three correct - 1 mark
 none/one/two correct - 0 marks

- (ii) ionic bonding; 1
- (iii) white/solid/insoluble **in water**/crystalline/brittle/hard/
 high melting point/boiling point/
 conducts electricity when molten/in cryolite/in solution; 1
 [Reject strong]

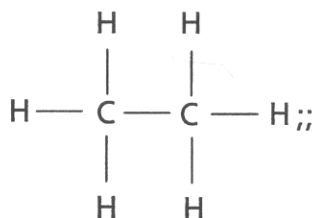
Total 10 marks

4. (a) (i) alkali metal **X** - rubidium/potassium;
 gas **Y** - hydrogen;
 solution **Z** - potassium/X hydroxide;
 [**X must** belong to group I or II] 3
- (ii) turns purple/blue;
Z is alkali/alkaline/pH >7/basic; 2
- (b) (i) 11.2 (g); 1
- (ii) $\frac{100 \times 11.2}{20}$; (= 56%) 1
- (iii) acid - sulphuric (acid);
 alkali - sodium (hydr)oxide; 2
- (c) (i) boron/carbon/nitrogen/oxygen/fluorine/neon; 1
- (ii) beryllium; 1
- (d) (i) electron arrangement 2 1; 1
- (ii) outer shell;
 has same no of electrons/one electron; 2

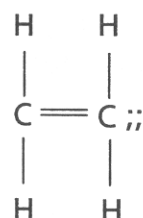
Total 14 marks

5. (a) A = petrol/gasoline/naphtha;
 [Reject petroleum]
 fuel for cars/petrochemicals;
 B = bitumen/tar;
 for roofing/water proofing/making roads; 4
 [Allow wrong fraction but correct use for 1 mark]
- (b) CO₂;
 H₂O;
 [Reject names] 2

(c)



1 mark for a two carbon
with C — C correct



1 mark for a two carbon
with C = C correct

4

[Allow ethane and ethene the wrong way around for 2 marks]
[Allow alkane and alkene correct way round with same number
of carbon atoms for 2 marks]

(d)

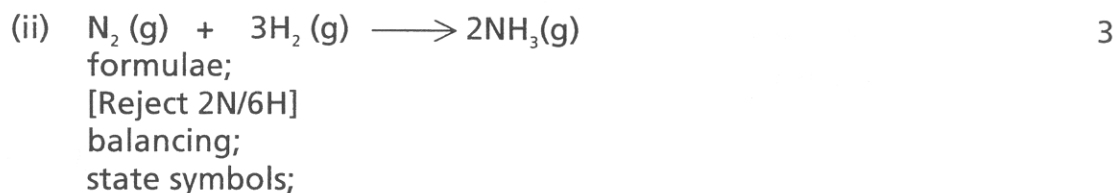
carbon with 4 electrons;
one shared pair of electrons in C — H bond;
fully correct;

3

Total 13 marks



(b) (i) air; 1



(c) (i) acid - base/neutralisation/exothermic; 1

(ii) $\text{NH}_4\text{NO}_3;$ 1

(d) **Either** Two advantages
or one advantage **and** explanation eg
easily absorbed by plants;
can be sprayed onto crops; max 2
plus either two disadvantages
or one disadvantage **and** explanation eg
easily washed out of soil;
causes eutrophication; max 2

Total 11 marks

7. (a) (i) Any two metals below magnesium in the reactivity series;; 2

(ii) any group 1 or 2 metal (except beryllium); 1

(b) (i) loss of electrons; 1

- (ii) $\text{Mg}^{2+} + 2 \text{e} \longrightarrow \text{Mg};$ 2
 [Allow Mg^{2+} for 1 mark]
 [Allow $\text{Mg}^+ + \text{e} \longrightarrow \text{Mg}$ for 1 mark]

Total 6 marks

8. (a) $\text{Cl}_2 + 2\text{I}^-/2\text{HI} \longrightarrow 2 \text{Cl}^-/2\text{HCl} + \text{I}_2$ 3
 any two correct formulae (on correct side of equation);
 all formulae correct;
 balanced;

- (b) (i) purple colour; 1

- (ii) An explanation to include:
 1. deeper (purple) colour;
 2. equilibrium moves to right;
 3. in direction of endothermic reaction/
 explanation from Le Chatelier; 3

- (iii) no effect; 1

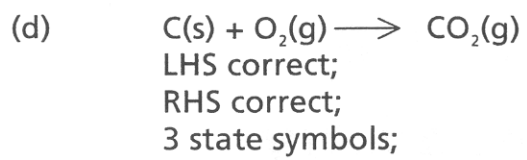
- (iv) $256 \text{ g HI} \longrightarrow 254 \text{ g I}_2;$
 $6.40 \text{ g HI} \longrightarrow \frac{254 \times 6.40}{256} = 6.35 \text{ g I}_2;$ 2
 [Allow 3.18 g for 1 mark]
 [Reject 6.4 g]

Total 10 marks

9. (a) both (forms of) carbon/giant covalent; 1

- (b) An explanation to include:
 1. different arrangement;
 2. of carbon atoms;
 [Accept appropriate relevant statements for 1 mark each] 2

- (c) An explanation to include two from:
 diamond 1. all electrons involved in bonding/
 four bonds per atom;
 2. no delocalised/spare electrons;
 graphite 1. three bonds per atom;
 2. delocalized/spare electrons; 2
 [To gain the second mark, electrons **must** be mentioned]



3

Total 8 marks

TOTAL MARK 90