## Syllabus 1036

## **Science: Chemistry**

## Paper 3H

## **MARK SCHEME - Summer 1999**

1.	(a)		methane;	1
	(b)		methane;	1
	(c)		65 – 73;	1
	(d)		hydrogen;	1
	(e)		carbon dioxide/CO <sub>2</sub> ; water/hydrogen oxide/H <sub>2</sub> O;	2
			Total 6 ma	rks
2.	(a)	(i)	В;	1
		(ii)	D;	1
		(iii)	C;	1
		(iv)	A;	1
	(b)		A diagram to include: 1. circles touching nearest neighbours; 2. circles in a regular arrangement;	2
	(c)		A description to include three from:  1. lose regular arrangement/become random; [Accept take on shape of container]  2. remain mostly in contact with nearest neighbours; 3. vibrate/move more; 4. move about/around; 5. move (slightly) further apart;	
			[Ignore references to bonding/gaining energy]	3

**Total 9 marks** 

	(b)	(i)	red/pink; [Reject orange]	1
		(ii)	purple/violet/blue; [Reject green]	1
	(c)	(i)	7;	1
		(ii)	25 (cm³);	1
		(iii)	sodium chloride:	1
		(iv)	white/cubic crystals;	1
		(v)	ionic;	1
		(vi)	water; [Accept hydrogen oxide]	1
			Total 9 m	arks
4.	(a)	(i)	uses electricity/large amount of energy; [Accept magnesium chloride has a high melting point] [Reject electrolysis is expensive]	1
		(ii)	chlorine;	1
	(b)	(i)	A diagram to include: 1. two electrons in outer shell; 2. 2 : 8 : 2 electron arrangement;	2
		(ii)	An explanation to include:  1. Mg loses electrons; 2. two electrons; [dependent mark]	2
	(c)	(i)	$2 \text{ Mg} + O_2 \longrightarrow 2 \text{ MgO}$ correct formula $O_2$ ; balancing;	2
		(ii)	magnesium gains oxygen/magnesium loses electrons;	1
	(d)	(i)	gives out heat/energy;	1
		(ii)	A description to include:  1. temperature at start of experiment;  [Reject temperature of room/magnesium]  2. temperature change;  3. rise;	3

1

3. (a) 1;

5. (a) (i) HF - 20; HCI - 36.5; [Ignore q]

2

- (ii) A suggestion to include:
  - 1. lighter molecules/smaller relative formula mass;
  - 2. molecules move faster:

2

(b) protons - 17; neutrons - 20; electrons - 17;

3

(c) (i) covalent:

1

(ii) shared (pair of electrons);

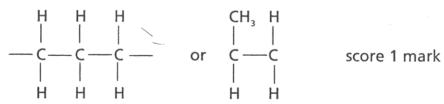
1

**Total 9 marks** 

6. (a)

(b)

1



(iii) poly(propene) stronger than poly(ethene)/ can stand the pressure;

1

2

**Total 7 marks** 

7.	(a)	(i)	most reactive - zinc lead
			copper least reactive - silver All correct – 1 mark
		(ii)	no. of moles of silver; no. of moles of copper; mass of copper;
			eg 2 × 108 / 216 g Ag> 63.5 g Cu;
			5 g Ag $\longrightarrow$ 5 x $\frac{63.5}{216}$ g Cu;
			= 1.47 / 1.50 g Cu; [Accept 5.88 g or 2.94 g for 2 marks and 0.74 g for 1 mark] 3
		(iii)	Pb(s) + 2AgNO₃(aq) → Pb(NO₃)₂(aq) + 2Ag(s) correct formulae; balanced; correct state symbols; [MUST be this equation]
	(b)	(i)	compound containing H <sup>+</sup> - any suitable acid;
	(5)	(1)	compound containing I - any soluble iodide; [Reject water] 2
		(ii)	zinc loses electrons; 1
		(iii)	2; 1> 1 <sub>2</sub> + 2e;
			Total 12 marks
8.	(a)	(i)	$N_2 + 3H_2 \rightleftharpoons 2NH_3$ correct formulae; balanced; [Ignore equilibrium sign] 2
		(ii)	fully correct;; [Allow 1 mark for one correct N-H bond] 2
		(iii)	An explanation to include: 1. energy needed to break bonds; 2. energy released when bonds formed; 3. more energy released than needed/OWTTE; 3
	(b)	(i)	An explanation to include three from:  1. more methanol formed/higher yield of methanol/faster reaction;  2. higher pressure reduces volume;  3. either more frequent collisions;
			or equilibrium moves to the right; 3

- (ii) One disadvantage from:
  - 1. greater safety risks;
  - 2. more expensive qualified;

1

- (iii) An explanation to include three from:
  - more methanol formed/higher yield of methanol/ cheaper to operate;
  - 2. as reaction is exothermic;
  - 3. so equilibrium moves to the right;

3

- (iv) An explanation to include two from:
  - 1. slower reaction;
  - 2. particles **collide** with less energy/less frequently; [Reject longer time unqualified]

2

**Total 16 marks** 

9. (a) igneous rock;

plus a description to include three from:

- 1. formed when magma/molten rock;
- 2. solidifies or cools down:
- 3. different rates give different crystal sizes;

4

(b) (i) 
$$Sn = \frac{3.57}{119}$$
  $O = \frac{0.96}{16}$   $\frac{mass}{R.A.M}$ 

$$= 0.03 = 0.06$$

$$Sn: O = 1:2$$

correct ratio;

formula:

3

- (ii) An explanation to include:
  - 1. strong forces between particles;
  - 2. giant/ionic/lattice structure; [Ignore covalent/type of bonding]

2

**Total 9 marks** 

**TOTAL MARKS 90**