

# IGCSE DA Chemistry 4437 5H

## Mark Scheme (Results)

### Summer 2007

IGCSE

## IGCSE DA Chemistry 4437 5H

## IGCSE CHEMISTRY 4437, MAY 2007 MARK SCHEME

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### Paper 5H

1. (a) catalyst 1
- (b) (i) line steeper  
reaches same level 2
- (ii) line shallower  
reaches same level 2
- (c) glowing spill  
relights (dependent on first point) 2
- Total 7 marks
2. (a) heat 1
- (b) (i) diffusion 1
- (ii) ammonium chloride /  $\text{NH}_4\text{Cl}$  1
- (iii) ammonia faster / hydrogen chloride slower 1
- (iv) A : red  
B : blue 2
- Total 6 marks
3. (a) (i) ticks in 1<sup>st</sup> and 3<sup>rd</sup> boxes 2
- (ii) contains a double/multiple bond /  
can undergo addition reactions  
(accept a specific **addition** reaction except bromine) 1
- (b) (i) orange / yellow  
colourless 2
- (ii) correct structure of 1,2-dibromoethane 1
- (c) correct structures for two isomers of  $\text{C}_4\text{H}_8$   
but-1-ene, but-2-ene (cis + trans)  
cyclo-butane, cyclo-methyl propane, methyl propene 2
- Total 8 marks
4. (a) (i) any two from:  
fizz / bubble  
move / darts about  
melts / forms a ball  
gets smaller / disappears (reject dissolves) 2
- (ii) sodium + water  $\rightarrow$  sodium hydroxide + hydrogen 1
- (iii) blue / purple  
(solution made is) alkaline / (contains) hydroxide ions /  $\text{OH}^-$   
not just "alkali metal"  
pH 11  $\rightarrow$  14 (any in range) 2
- (b) (i) electrons being transferred between oxygen and sodium (can be  
wrong way round)  
idea of sodium losing electron(s) and oxygen gaining electron(s)

- correct numbers of electrons involved (sodium lose 1, oxygen gain 2)  
(sharing = 0 marks) 3
- (ii) Na<sub>2</sub>O 2

**Total 9 marks**

5. (a) (compounds containing) carbon and hydrogen (atoms) only 2
- (b) cracking  
heat / 400 - 1000 °C / high temperature (reject boil)  
steam / catalyst / (high) pressure / 5-100 atm 3
- (c) (i)  $2\text{CH}_4 + 3\text{O}_2 \rightarrow 2\text{CO} + 4\text{H}_2\text{O}$   
all formulas correct = 1; balancing = 1 2
- (ii) toxic / poisonous / death / fatal (reject suffocate)  
correct reference to blood or haemoglobin 2

**Total 9 marks**

6. (a) NH<sub>4</sub><sup>+</sup>  
Cl<sup>-</sup> 2
- (b)  $\text{NH}_4\text{Cl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{NH}_3$  (reject NH<sub>4</sub>OH)  
  
NaCl + H<sub>2</sub>O = 1 NH<sub>4</sub>Cl, NaOH, NH<sub>3</sub> = 1 2  
incorrect balancing = max 1

- (c) silver nitrate  
white precipitate - only if AgNO<sub>3</sub>  
 $\text{NH}_4\text{Cl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NH}_4\text{NO}_3$  /  $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$  3  
(allow  $\text{AgNO}_3 + \text{Cl}^- \rightarrow \text{AgCl} + \text{NO}_3^-$ )

**Total 7 marks**

7. (a) 2.8.7 1
- (b) 7 1
- (c) brown / orange  
(to) colourless 2
- (d) (i) red / pink  
(hydrobromic) acid formed / H<sup>+</sup> ions present 2
- (ii) blue  
no acid formed / no reaction / no H<sup>+</sup> ions 2

**Total 8 marks**

8. (a) **atoms** of the same element / **atoms** with same number of protons/atomic number  
(but) different numbers of neutrons/mass numbers 2
- (b) (i)  $\begin{matrix} 26 & 54 \\ 26 & 30 \end{matrix}$   
both  $26 = 1$ ;  $54 = 1$ ;  $30 = 1$  3
- (ii)  $(54 \times 0.08) + (56 \times 0.92)$   
55.8 2  
(final answer = 2)
- (c) same number of (outer shell) electrons / same electronic configuration 1

**Total 8 marks**

9. (a) (i) X  
Y and Z 2
- (ii) X and Y and Z  
X (ignore Z) 2
- (iii) X / CO<sub>2</sub>  
only weak forces/forces between molecules to be overcome  
little energy needed to overcome / weaker than covalent bonds 3
- (iv) Z / graphite  
layers / plates  
slide over each other (easily) 3  
(reject if delocalised electrons given)
- (b) covalent bonds need to be broken/overcome  
(which are) strong / many / need a lot of energy (to break) 2  
(reject if ionic / internal / 4 bond etc)

**Total 12 marks**

10. (a) decreased  
decreased 2
- (b) (i) move closer together  
move more slowly / lose energy 2
- (ii) H<sub>2</sub> 1
- (c) 6 shared electrons between two N atoms (ideally 3 • and 3 x)  
both N atoms with 2 unshared electrons (*dependent on above*)  
(**ACCEPT** all dots or all crosses or any mixture) 2

**Total 7 marks**

11. (a) (i)  $(1 + 80 =) 81$  1
- (ii)  $1.62 \div 81$   
 $= 0.02$  **ALLOW ecf** 2
- (b) (i)  $\text{HBr} + \text{NaOH} \rightarrow \text{NaBr} + \text{H}_2\text{O}$  1
- (ii) pipette  
burette 2
- (iii) methyl orange / phenolphthalein  
red / colourless  
yellow / orange / pink / red 3

**Total 9 marks**

**PAPER TOTAL 90 MARKS**