



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
January 2012**

Chemistry

Assessment Unit AS 2

assessing

**Module 2: Organic, Physical
and Inorganic Chemistry**

[AC122]

THURSDAY 19 JANUARY, AFTERNOON

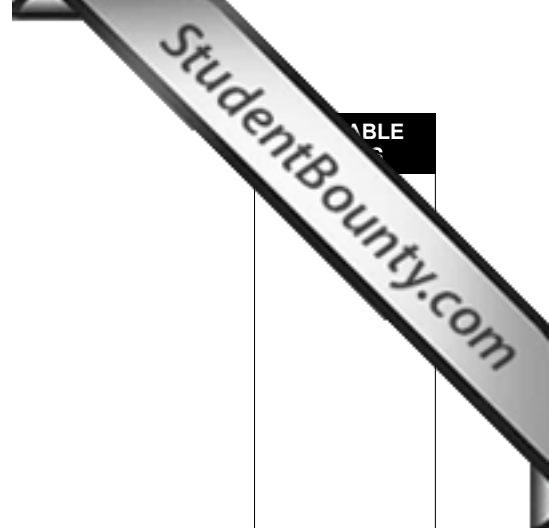
MARK SCHEME

Section A

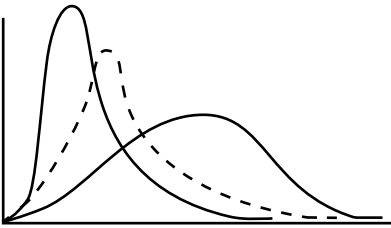
- 1 B
- 2 B
- 3 C
- 4 C
- 5 C
- 6 A
- 7 A
- 8 B
- 9 B
- 10 C

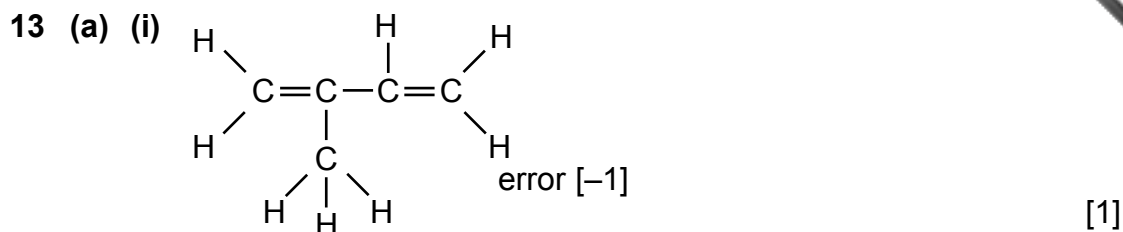
[2] for each correct answer

[20]	20
Section A	20



Section B

11 (a)	number of particles – y axis (kinetic) energy – x axis	[1] [1]	[2]	
(b)			[2]	
(c)	0 particles 0 energy	[1] [1]	[2]	6
12 (a) (i)	solubility increases with increase in temperature/ goes to the RHS as temperature increases ∴ endothermic	[1] [1]	[2]	
(ii)	less soluble than CaSO ₄ more soluble than BaSO ₄	[1] [1]	[2]	
(b) (i)	$\text{Sr} + 2\text{H}_2\text{O} \rightarrow \text{Sr}(\text{OH})_2 + \text{H}_2$		[2]	
(ii)	$\text{Sr}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{SrSO}_4 + 2\text{H}_2\text{O}$		[2]	
(c)	nichrome/platinum wire blue flame conc. hydrochloric acid green	[1] [1] [1] [1]	[4]	
	Quality of written communication		[2]	
(d) (i)	$\text{SrSO}_4 \rightarrow \text{SrO} + \text{SO}_3$		[1]	
(ii)	size of cation/charge on cation sulfate ion distorted/deformed by Sr ²⁺ (Any two)		[2]	17



groups the same i.e. H and H (reference to both C=C) [1] [2]

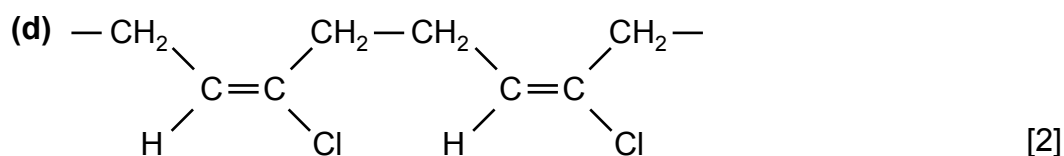
(b) 2-methylbut(a)-1,3-diene or 2-methyl-1,3-butadiene [1]



(ii) nickel [1]

(iii) finely divided [1]

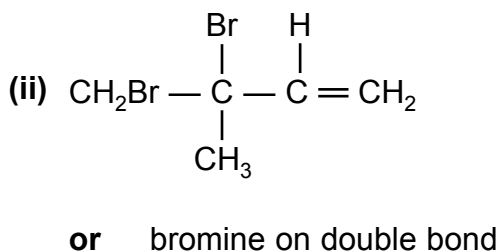
(iv) van der Waals forces greater in isoprene [1] [2]



(e) (i)

C	26.3	$\frac{26.3}{12}$	=	2.19	$\frac{2.19}{0.88}$	=	2.5
H	3.5	$\frac{3.5}{1}$	=	3.5	$\frac{3.5}{0.88}$	=	3.97
Br	70.2	$\frac{70.2}{80}$	=	0.88	$\frac{0.88}{0.88}$	=	1

error [-1] $\times 2$ $C_5H_8 Br_2$ [3]



(f) carbon } (either order) [1]
carbon monoxide } [1] [2]

14 (a)	0.47g	[1]		
	$C_4H_{10} = 58$	[1]		
	$\frac{0.47}{58} = 0.0081 \text{ mol}$	[1]		
	$50 \times 4.2 \times 55 = 11550 \text{ J}$	[1]		
	$\frac{11550}{0.0081} = (-)1425.9 \text{ kJ}$	[1]	[5]	
(b)	draughts	[1]		
	incomplete combustion	[1]		
	loss heat to the copper can	[1]	[3]	
(c)	more bonds produced in combustion of butane	[1]		
	forming bonds gives out heat	[1]	[2]	
(d)	no	[1]		
	the spark is heat/not a chemical	[1]	[2]	12
15 (a) (i)	$C_2H_5Br + KOH \rightarrow KBr + H_2O + C_2H_4$		[1]	
(ii)	ethene		[1]	
(iii)	bromine water	[1]		
	goes colourless	[1]	[2]	
(iv)	gas is not one of the reactants		[1]	
(b) (i)	$C_2H_5Br + KOH \rightarrow C_2H_5OH + KBr$		[1]	
(ii)	nucleophile – ion or molecule with lone pair of electrons/ attracted to an area of low electron density	[1]		
	substitution – one (functional) group replaced by another	[1]	[2]	
(iii)	$CH_3-CH_2Br \xrightarrow{OH^-} \left[\begin{array}{c} H \\ \\ CH_3-C \cdots Br \\ \quad \cdot \\ H \quad OH \end{array} \right]^-$ \downarrow $CH_3CH_2OH + Br^-$		[3]	
(iv)	bond enthalpy of C—Cl greater	[1]		
	C—Cl is more polar	[1]		
	bond enthalpy more important	[1]	[3]	14

16 (a) (i) Haber Process	[1]	
(ii) no oxygen present	[1]	
(b) (i) $\text{KMnO}_4 = 39 + 55 + 64 = 158$ $2.5 \text{ g} = \frac{2.5}{158} = 0.0158 \text{ mol}$ $1 \text{ mol} \rightarrow 0.5 \text{ mol O}_2$ $\therefore \frac{0.0158}{2} \times 24 \text{ dm}^3 = 0.1896$ $= 190 \text{ cm}^3$		
error [-1]	[3]	
(ii) glowing splint relights	[1] [1]	[2]
(c) (i) catalyst/speeds up the reaction		[1]
(ii) gas passes through		[1]
(iii) not in a sealed container/reaction not reversible		[1]
(iv) bonds before $12 \text{ N—H} = 12 \times 391 = 4692$ $5 \text{ O=O} = 5 \times 498 = 2490$ <u>7182</u>		
bonds after $4 \text{ N=O} = 4 \times 587 = 2348$ $12 \text{ O—H} = 12 \times 464 = 5568$ <u>7916</u>		
$\Delta H = +7182 - 7916$ $= -734 \div 4 = 183.5$ \therefore -ve exothermic		
error [-1]	[4]	14

Section B	80
Total	100

