



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]

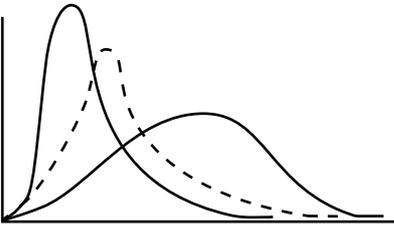
Section A

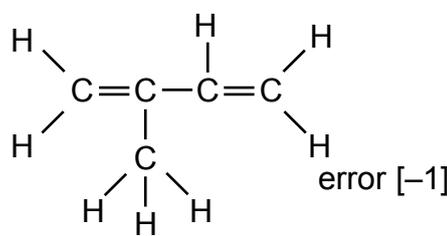
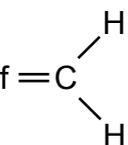
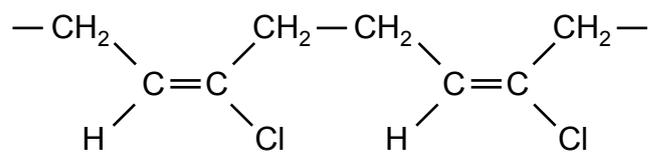
AVAILABLE
MARKS

20

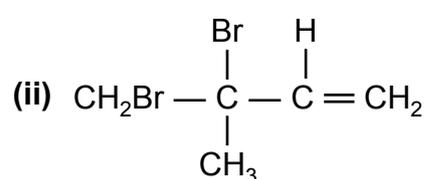
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Section B

			AVAILABLE MARKS
11 (a)	number of particles – y axis (kinetic) energy – x axis	[1] [1]	[2]
(b)			[2]
(c)	0 particles 0 energy	[1] [1]	[2]
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]
			6
			17

- 13 (a) (i)  error [-1] [1]
- (ii) no
because of  [1]
- 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]
- (c) (i) $C_5H_8 + 2H_2 \rightarrow C_5H_{12}$ [1]
- (ii) nickel [1]
- (iii) finely divided [1]
- (iv) van der Waals forces
greater in isoprene [1] [1] [2]
- (d)  [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]
- (ii)  [1]
- or bromine on double bond [1]
- (f) carbon } (either order) [1]
carbon monoxide } [1] [2]

AVAILABLE
MARKS

17

				AVAILABLE MARKS	
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]		[3]
		incomplete combustion	[1]		
		loss heat to the copper can	[1]		
	(c)	more bonds produced in combustion of butane	[1]		[2]
		forming bonds gives out heat	[1]		
(d)	no	[1]	[2]		
	the spark is heat/not a chemical	[1]			
15	(a)	(i) $C_2H_5Br + KOH \rightarrow KBr + H_2O + C_2H_4$	[1]	12	
		(ii) ethene	[1]		
		(iii) bromine water 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]		[2]
		substitution – one (functional) group replaced by another	[1]		
		(iii)	$CH_3-CH_2Br \xrightarrow{OH^-} \left[\begin{array}{c} H \\ \\ CH_3-C \cdots Br \\ \quad \vdots \\ H \quad OH \end{array} \right]^-$ \downarrow $CH_3CH_2OH + Br^-$		[3]
		(iv) bond enthalpy of C—Cl greater	[1]		[3]
		C—Cl is more polar	[1]		
	bond enthalpy more important	[1]			

16 (a) (i) Haber Process	[1]	AVAILABLE MARKS	
(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]		
(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 $12 \text{ N—H} = 12 \times 391 = 4692$ $5 \text{ O=O} = 5 \times 498 = \underline{2490}$ $\underline{7182}$ bonds after $4 \text{ N=O} = 4 \times 587 = 2348$ $12 \text{ O—H} = 12 \times 464 = \underline{5568}$ $\underline{7916}$ $\Delta H = +7182 - 7916$ $= -734 \div 4 = 183.5$ \therefore -ve exothermic			
error [-1]	[4]		
			14
	Section B		80
	Total		100