PRELIMINARY EXAMINATION 2018
Sc Chemistry Normal (A) (5105/5107)
Marking Scheme

PAPER 3
(20 marks)

1	2	3	4	5	6	7	8	9	10
C	D	C	C	A	C	A	D	B	A
11	12	13	14	15	16	17	18	19	20
B	D	A	D	D	D	C	A	C	B

PAPER 4
SECTION A (14 marks)

Question 1		ANSWER SCHEME	Marks/ Remarks
1	a	**combustion**	1m
	b	**displacement**	1m
	c	**substitution**	1m

Question 2		ANSWER SCHEME	Marks/ Remarks
2	a(i)	When chlorine atom gains an electron	1m
	a(ii)	To have a completely/fuly filled valence shell / stable noble gas electronic structure/ configuration	1m
	b	Molten calcium chloride consists of mobile calcium ions and chloride ions which act as charge carriers / conducts electricity. In solid state, the ions are held in fixed ionic lattice structure which can only vibrate about their fixed positions / hence not mobile to act as charge carriers/ conduct electricity	1m for mobile ions 1m for 'vibrate about their fixed positions' as qn ask for ref to KPT

Question 3		ANSWER SCHEME	Marks/ Remarks
	a	Dilute nitric acid	1m
	b	Both barium oxide and barium sulfate are insoluble ; cannot separate the insoluble barium sulfate formed from the insoluble barium oxide. / $BaSO_4$ formed coats onto BaO , causing reaction to stop abruptly and yield of $BaSO_4$ is low.	1m for mentioning the insolubilities of both compounds. 1m to mention cannot be separated/ coating preventing further reaction

<table>
<tr><td></td><td>c</td><td>Add excess aqueous barium nitrate to a fixed volume of dilute sulfuric acid. (no mark)
<u>Filter</u> <u>to obtain barium sulfate as residue.</u>
<u>Wash</u> <u>with distilled water.</u>
<u>Dry</u> <u>between sheets of filter papers.</u></td><td>1m for each step</td></tr>
<tr><td></td><td>d</td><td><table><tr><td>compound</td><td>formula</td><td>relative formula mass, M_r</td><td>number of moles</td></tr><tr><td>barium sulfate</td><td>$BaSO_4$</td><td><u>233</u></td><td><u>0.429 / 0.43</u></td></tr></table></td><td>Both ans corr – 1m</td></tr>
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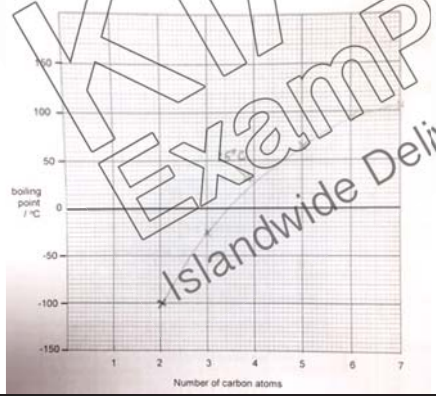
SECTION B: (16 marks)
Any TWO Questions

Question 4		ANSWER SCHEME	Marks/ Remarks
4	a(i)	Stainless steel contains <u>different sized atoms</u> which <u>disrupts</u> the <u>orderly layered arrangement</u> of atoms in pure iron. When a force is applied, the layers of atoms <u>do not slide over each other</u>, hence being stronger and harder than pure iron.	'layer' must be evident at least once. 4 pts – 2m 2/3 pts – 1m
	a(ii)	As a protective layer to prevent <u>oxygen</u> in the air and <u>water</u> from reacting with iron to form <u>rust</u>.	1m – mention both oxygen (not air) and water 1m – mention rust/ rusting
	b(i)	Zinc Magnesium Silver Iron	2m – all correct (1m for every 2 in correct order)
	b(ii)	Hydrogen; Gas extinguishes a lighted splint with a pop sound	1m 1m

Question 5		ANSWER SCHEME	Marks/ Remarks
5	a(i)	$S + O_2 \rightarrow SO_2$	1m
	a(ii)	Acidic	
	a(iii)	Sulfur dioxide reacts with oxygen and <u>dissolves in rain to form acid rain</u> which (any one) - Destroys metal structures - Destroys/ damage limestone buildings - Destroys aquatic habitats by making them too acidic for aquatic life - Soil pH may be lowered, making it unsuitable for some plants to survive	1m – formation of acid rain 1m – how environment is damaged

	b(i)	Electronic configuration of sulfur and oxygen are 2,6 and 2,8,6 respectively. They are in the same group because they have same number of valence electrons/ 6 valence electrons	1m
	(ii)	They are in different Period because they have different number of electron shells. / Oxygen atom has 2 electron shells while sulfur atom has 3 electron shells.	1m
	(c)	Sodium hydroxide hydrogen	1m 1m

Question 6		**ANSWER SCHEME**	**Marks/ Remarks**
2	**a(i)**	x = **4** y = **8**	1m for both correct
	a(ii)	Any 2: - Same general formula - Same functional group - Consecutive members differ by $-CH_2$ group - Gradual change in physical properties - Similar chemical properties	2m
	b(i)		1m for the 5 points correctly plotted 1m for smooth best fit curved line
	b(ii)	25ºC	1m
	b(iii)	The higher the number of carbon atoms, the higher the boiling points of the alkenes due to the stronger intermolecular forces of attraction which requires more heat energy to overcome.	1m – need to mention stronger intermolecular forces to explain
	b(iv)	Reddish brown colourless	Both corr -1m