Fuchun Secondary School

Secondary 4 Express

Science Chemistry (5076)

Prelim Examination 2019

Marking Scheme

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

Section A	Answer	marks	Markers report
A1a	G	1	
A1b	E	1	
A1c	D	1	
A1d	F,G	1	
A1e	H	1	
A2ai	Down group I, melting point and boiling point decreases. Down group VII, melting point and boiling point increases.	1 1	
A2aii	Down the group, The density increases, The color darkens The reactivity decreases	Any Two 2m	
A2bi	Two atoms chemically bonded together	1	Badly done
A2bii	Covalent bond sharing of two electrons Correct number of unshared electrons for chlorine atoms Outer shells only –penalise 1m	1 1	
A2bii	Correct charge and electrons for Na ion Correct charge and electrons for Cl ion All shells must be drawn –penalise 1m	1 1	

A2bii	In solid state, the ions are **held together by strong electrostatic forces of attraction** in a giant lattice structure. They cannot conduct electricity In aqueous and molten state, the **ions are mobile** and can conduct electricity	1 1	Wrong keywords such as electrons and atoms were used instead of ions
A3	K: element L: compound M: mixture N: Mixture O: Either an element or compound	1 x 5	
A4a	Potassium sulfate: sulfuric acid, potassium hydroxide, (do not accept potassium) Sodium chloride: Sodium hydroxide/sodium carbonate Magnesium nitrate: magnesium Copper(II) sulfate: $CuSO_4$	1 x 5	Many students gave " potassium" and "sodium" as answers. They also gave examples of other salts instead of reagents
A4b	$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$	2	
A4c	Evaporate/heat the solution till saturation Leave it to cool and crystallise. Collect the crystals by filtration, rinse with little deionised water. Press dry between sheets of filter paper.	1 1	Badly done. Students need to know the steps of salt prep.
A4d	Any 2 insoluble salt, Lead chloride, silver chloride, Barium sulfate, lead sulfate, calcium sulfate Or any carbonate other than SPA carbonates. Must be name and not chemical formula	1 x 2	Badly done Many students forgot their insoluble salts and gave even hydroxides observed in QA as answers.
A5ai **A5aii**	Respiratory probelms /breathing difficulties Combines with haemoglobin in blood and prevent oxygen from being transported around the body, leading to brain damage or death	1 1	 For CO, improper answers such as "fuse with blood cells" or " reduce amount of haemoglobin" were unacceptable.

A5b	**2**CO + **2**NO → **2**CO_2 + N_2	1	
A5bii	Substance reduced: NO Reason: NO is reduced as it loses oxygen to form N_2. Starting and ending species with reason must be given	1 1	They could recognise what species is reduced but cannot explain. Quoted wrong oxidation state for nitrogen in NO.
A6	F: Iron (II) sulfate G:Barium sulfate H:Iron(II) hydroxide J: Iron(III) sulfate K: Iron (III) hydroxide Must be names and not chemical formula	1 x 5	
A7	Bitumen Calcium oxide/ calcium hydroxide Hydrogen	1 x 3	Could not identify hydrogen.
	Section B		
B8a	C + O_2 → CO_2 In the blast furnace, Carbon in coke burns in air to form carbon dixoide. CO_2 + C → 2CO Carbon dioxide further reacts with coke to form carbon monoxide. Fe_2O_3 + 3CO → 2Fe + 3CO_2 Carbon monoxide then **reduces iron(III) oxide,** haematite, to form molten iron and carbon dioxide.	1eqn 1eqn 1eqn 1m for all the three proper descriptions	Those who attempted managed to at least get the equations right.
B8b	Steel is an alloy of iron. It is stronger and harder than iron.	1 1	
B8c	No of moles of 10000g of iron = 10000/56 mol No of moles of carbon dioxide = (10000/56) x 3/2 mol Volume of CO_2 = (10000/56) x 3/2 x 24 = 6428.57 dm^3	1 1 1	

	Mass of CO_2= (10000/56) x 3/2 x 44 = 11 785.71g All units not correct/ or not given- penalise 1m Allow ecf accordifng to eqn given by student in 8bi	1	
B9a	Crude oil is heated until it becomes vapor. The vapor cools and condenses in the fractionating tower and is collected into different fractions according to their different boiling points. The fraction with the lowest boiling point will condense and be collected at the top of the fractionating tower. The fraction with highest boiling point will condense and be collected at the bottom of the fractionating tower.	1 1 1	Many inappropriate keywords. Students ans were highlighted for teachers to refer to.
B9bi	They have the same functional group; They have the same general formula; They differ by one $-CH_2$ group; They have the similar chemical properties	Any two (2m)	Same vs Similar Example similar functional group or similar general formula is different from same functional group and same general formula.
B9bii	C_nH_{2n+2}	1	
B9biii	Methane, CH_4	1 1	Students did not recall formula for methane
B9ci	Draw C_2H_4	1	
B9cii		1	Badly done. Either drew three units or ended the

			chain by adding hydrogen atoms
B10ai	Paint acts as an **protective layer,** Prevents contact with **oxygen and water**	1 1	Many did not mention protective layer
B10aii	Measure the mass of each nail and record it as No and Mo. Place nail in a test tube labelled N filled with distilled water. Place the second nail in a test tube M filled with saltwater. Leave the test tubes in the lab for a week. Measure the dry mass of each nail and label it as N1 and M1. Calculate the mass gain as N1-N0 and M1-Mo. The one with the higher mass gain has rusted more.	1 1 1 1 1	Badly done. Students want to time the rusting process. Students were highlighted for teachers to take note of
B10bi	$3Fe + 4H_20 \rightarrow Fe_3O_4 + 4H_2$	2	
B10bii	Insert a lighted splint. If the gas extinguishes the flame with a pop sound, it is hydrogen.	1 1	