



Rewarding Learning

**General Certificate of Secondary Education
2012**

Science: Chemistry

Paper 1
Foundation Tier

[G1401]

TUESDAY 12 JUNE, MORNING

**MARK
SCHEME**

1 (a) (i)

Element	Atomic number	Metal or Non-metal
Carbon	6	non-metal [1]
Tin	50	metal [1]
Lead	82	metal [1]

[1] each row [3]

(ii) substance which consists of one type of atom [2]
or substance which cannot be broken down into anything simpler [1]
 by chemical means [1] [2]

(iii) number of protons [1]

(b) (i)

Isotope	Number of protons	Number of electrons	Number of neutrons
^{12}C	6	6	6
^{13}C	6	6	7
^{14}C	6	6	8

[1] for each column [3]

(ii) atoms of the same element/same atomic number/same number of protons [1]
 different number of neutrons/different mass number [1] [2]

(c) (i) different forms/structures of the same element [1]
 in the same (physical) state [1] [2]

(ii) 2,8,1 [1]
 2,8,7 [1]
 Na^+ [1] 2,8 [1]
 Cl^- [1] 2,8,8 [1]
 ions held by attraction between opposite charges [1] Maximum [6]

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2 (a) (i) $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ [3]

(ii) white [1] crystalline [1] solid [1] Maximum [2]

(iii) shiny/grey [1]

(iv) goes dull/tarnishes [1]

(v) under/in oil [1]

(b) (i) lower density **than** water [1]

(ii) (the sodium) melts [1]

		AVAILABLE MARKS
	(iii) sodium hydroxide/OH ⁻ /hydroxide ions produced [1] alkaline [1] solution	[2]
	(iv) $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$	[3]
3	(a) (i) carbon dioxide [1] low [1] citric acid/ascorbic acid/carbonated water [1]	[3]
	(ii) Solute = solid which dissolves	[1]
	Solubility = mass [1] of solid which saturates [1] 100 g water [1] at a particular temperature [1] allow idea of maximum mass for saturate	[4]
	(iii) Increasing solubility with increasing temperature	[1]
	(b) (i) water which does not lather with soap [1] water which does not lather readily with soap [2]	[2]
	(ii) B [1] contains largest calcium and/or magnesium ion concentration/mass [1] [2]	
	(iii) equal volumes of mineral water [1] add soap and shake [1] most soap for lather/most scum/least or no lather = hardest water [1] [3]	
	Quality of written communication	[2]
	(iv) pH paper/Universal Indicator [1] compare to colour chart [1]	[2]
	(v) C [1] lowest pH [1]	[2]
	(vi) any compound containing one positive and one negative ion from the lists below: positive ions: calcium/magnesium/sodium/potassium negative ions: hydrogen carbonate/chloride/sulphate/nitrate [1] correct formula of named compound [1]	[2]
		24

			AVAILABLE MARKS	
4	(a)	any two from: natural gas, LPG, petrol, diesel, paraffin, candlewax, peat, lignite, coke, coal	Maximum [2]	18
	(b) (i)	contains only [1] carbon and hydrogen [1]	[2]	
	(ii)	any two from: global warming ice caps melt flooding rise in sea level climate change	[2]	
	(c) (i)	carbon monoxide [1] water [1]	[2]	
	(ii)	11	[1]	
	(d) (i)	reaction [1] of a substance/fuel with oxygen [1] forming oxides [1] releasing energy [1]	Maximum [3]	
	(ii)	can be replaced [1] in a limited period of time [1]	[2]	
	(e) (i)	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$	[3]	
	(ii)	produces water/product is non-polluting	[1]	
	5	(a)	Mendeleev [1] Newlands [1] mass [1] octaves [1] periods [1]	
(b) (i)		caesium	[1]	
(ii)		fluorine	[1]	
(iii)		bromine	[1]	
(iv)		oxygen/neon/argon/xenon/krypton/radon	[1]	
(v)		full outer shell of electrons	[1]	

- (c) (i) solid
- (ii) 7
- (iii) 1--
- (iv) HAt

[1]

[1]

[1]

[1]

Total

**AVAILABLE
MARKS**

14

90