MARK SCHEME for the May/June 2014 series

0620 CHEMISTRY

0620/21

Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



Page 2			Mark Scheme	Syllabus	Paper				
				IGCSE – May/June 2014	0620	21			
1	(a)	(i)		nesium / Mg w: methane / CH ₄		[1]			
		(ii)	hydr	rogen / H ₂		[1]			
		(iii)	carb	on monoxide / CO		[1]			
		(iv)	copp	per / Cu		[1]			
		(v)		ium oxide / CaO; w: carbon dioxide / CO ₂		[1]			
	(b)	 a) 1 mark for each correct word: seven; trend; 							
			lium.	colour;		[4]			
						[Total: 9]			
2	(a)	 (a) any three points (1 mark each) e.g. <u>electrons</u> random / <u>electrons</u> not in shells ORA e.g. <u>electrons</u> in shells electrons are negatively charged ORA positive charge spread out / diffuse charge ORA e.g. protons have + charge no nucleus ORA e.g. nucleus present no protons / no neutrons / no nucleons / no nuclear particles ORA 							
	(b)	(i) different number of neutrons / different mass number / different nucle number				n [1]			
		(ii)	•	suitable use e.g. energy production / nuclear power / power stations measuring thickness of paper finding cracks in pipelines / pipes smoke alarms		[1]			
	(c)	melting point any value between 120–200 (°C) atomic radius any value between 0.220 and 0.240 (nm)							
	(d)	(i)		ım hydroxide; rogen		[1] [1]			
		(ii)	pH 1	13		[1]			
	(e)	e) 1 electron in outer shell; inner shells correct i.e. 2, 8, 8							

	Page 3			Mark Sch		Syllabus	Paper 21	
3	(a)	IGCSE – May/June 2014 0620 the more (carbon) atoms, the higher the boiling point						
	(b)	•	naph	ha ating (oil) / lubricant			[2]	
	(c)	(i)	corre	ct structure of ethane show	ing all atoms and bond	ds;	[1]	
		• •		er shell electrons for C; ding pairs of electrons rep	resenting each C–H bo	ond;	[1] [1]	
	(d)	(i)	C₃H ₆				[1]	
		. ,	ALL	high temperature; W: quoted temperature va W: high pressure	lues between 300-800	°C	[1]	
							[Total: 8]	
4	(a)	 a) any four from: atoms in gas irregularly arranged / randomly arranged / far apart / all over th place atoms in gas moving very fast / free to move / bouncing around atoms slow down during condensation / move less than before atoms become less randomly arranged / less irregularly arranged durin condensation / atoms get closer together in condensation atoms in liquid are irregularly arranged / close together / touching atoms in liquids slide over each other / atoms in liquids move slowly atoms slow down (further) during freezing atoms in solid <u>only</u> vibrate atoms in solid are regularly arranged / touching / close to each other 						
	(b)	4 / fo	our				[1]	
	(c)	Any physical property e.g. malleable / ductile / conduct heat / conduct electricity / conducts (unqualified) / silvery / shiny / sonorous ALLOW: high melting point / high boiling point / solid at room temperature IGNORE: reference to density / hardness					[1]	
	(d)	silver < tin < iron < magnesium 1 mark if 1 pair inverted / magnesium > iron > tin > silver				[2]		

Page 4		1	Mark Scheme	Syllabus	Paper	
				IGCSE – May/June 2014	0620	21
	(e)	(i)	2 (C 2 (C	O);) dependent on 2CO being correct;		[1] [1]
		(ii)	pois	onous / toxic;		[1]
						[Total: 11]
5	(a)			correctly (on either left or right top pipes at base of a correctly on one of the two pipes at the top	furnace)	[1] [1]
	(b)	hen	natite			[1]
	(c)	(i)	heat	given off / energy given out		[1]
		(ii)	turns	water; s milky / turns cloudy / white precipitate; e: second mark dependent on first being correct		[1] [1]
	(d)	iron	ı oxid	e is losing oxygen / CO is gaining oxygen		[1]
						[Total: 7]
6	(a)	ring	ı arou	ind the OH group only		[1]
	(b)	(i)	•	eft) sugar / glucose / any other suitable sugar; ˈight) carbon dioxide;		[1] [1]
		(ii)	enzy	/mes;		[1]
	(c)	C₂⊦	I 4			[1]
	(d)			s up to a maximum / increases up to given figure a peak;	e between 35–40°C /	[1]
	(e)	(i)		sity) increases as the number of carbon atoms incre w: decreases as the number of C atoms gets lower	eases;	[1]
		(ii)	prop	anol;		[1]
		(iii)	is ab a) g melt	<u>d</u> because its melting point is below room tempera pove room temperature / becomes liquid at –79°C (as until 138°C / room temperature is between t ing point (room temperatures for last answer ca	and does not become the boiling point and	
			40°0	(c)		[1]
						[Total: 10]

	Page 5			Mark Scheme		Paper		
				IGCSE – May/June 2014	0620	21		
7	(a)	squ not		[1]				
		solvent at bottom of tank with paper dipping into it; note: solvent does not have to be labelled / paper can just touch the surface But there should be no gap between the solvent and the paper						
		wat		[1]				
	(b)	place spot of ink / dye on the paper; note: answer must imply a spot or drop (not just ink put on paper)						
		abo		[1]				
		let the solvent run up the paper / solvent moves the dyes up the paper / some idea that solvent is needed for the movement of the spots;						
	(c)	any	any suitable solvent e.g. ethanol / butanol / ester / alcohol					
	(d)	(i)	W, X	K and Y;		[1]		
		(ii)	4 / fo	our;		[1]		
	(e)	(i)		that ethene is the monomer / idea that monomer c) units which add together;	rs are the simple (or	[1]		
			idea that poly(ethene) is the polymer / idea that the polymer is formed adding ethene units / simple units combine to form polymer / idea th polymer is a very long (hydrocarbon) chain;					
		note		e: (ethene) monomers join to make a polymer = 2 ma	arks			
		(ii)	<u>mixt</u>	ure of metals / <u>mixture</u> of metal + non metal;		[1]		
	(f)	(i)		easing strength decreases (thermal) conductivit ductivity the higher the strength;	y / the lower the	[1]		
		(ii)	high	strength aluminium;		[1]		
			has	high strength / it is strong / aircraft body need to be	strong;	[1]		
			it ha	s low density / it is light(weight) / aircraft body needs	to be light(weight)	[1]		
8	(a)	(i)	2 (S	O ₂);		[1]		
		3 (O ₂);				[1]		

Page 6	Mark Scheme	Syllabus	Paper				
	IGCSE – May/June 2014	0620	21				
	(ii) causes acid rain / it is acidic / it acidifies (something);						
	rodes (limestone) buildings / erodes mortar / corr ridges / erodes named carbonate rock	odes metalwork / corro	odes [1]				
(b) filtratio	on / filtered		[1]				
(c) (i) ca	athode;		[1]				
(ii) la	st / 4th box ticked (zinc at negative electrode and	d O ₂ at positive electroc	le); [1]				
			[Total: 7]				