## UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

**International General Certificate of Secondary Education** 

## MARK SCHEME for the May/June 2010 question paper for the guidance of teachers

## 0620 CHEMISTRY

0620/22

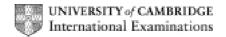
Paper 22 (Core Theory), maximum raw mark 80

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.

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Page 2	Mark Scheme: Teachers' version	Syllabus	Paper	
	IGCSE – May/June 2010	0620	22	

1	(a)	(i)	titanium / vanadium / zirconium / niobium max [2] (1 mark each) allow: symbols	[2]
		(ii)	Na / Mg	[1]
		(iii)	sodium / Na	[1]
		(iv)	potassiu / K	[1]
		(v)	vanadium / V	[1]
	(b)		rect balance	[1] [1]
2	(a)	(i)	A: giant ionic B: simple atomic C: simple molecular D: metallic	[1] [1] [1]
		(ii)	B and C (both needed for mark)	[1]
	(b)	soli	d; molten;	[2]
3	(a)		plant / making ethanol / any other names large scale relevant reaction . making sulfuric acid	[1]
	(b)		e / anhydrous cobalt chloride (paper); turns pink; white / anhydrous copper sulfate; turns blue;	[2]
	(c)	(i)	lighted splint;	[0]
		(ii)	pops / explodes; pH 12	[2] [1]
		(11)	ρι ι <b>Δ</b>	ניו
	(d)	(i)	3 (CO <sub>2</sub> ); 4(H <sub>2</sub> O);	[2]
		(ii)	combustion	[1]
		(iii)	36 (mg)	[1]

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper	
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(a) Any 2 of: 4 diffusion / ink particles move / water particles or molecules move / movement of particles is random / [2] (b) two or more substances (together) that can be separated by physical means [1] (c) (i) ethanol [1] allow: carboxylic acids (ii) oxidation state / third box down ticked [1] (iii) idea of small molecules / monomers joining / repeating units; [2] long chains / large molecules formed; (d) (i) ring around COOH group [1] (ii) removal of oxygen / decrease in oxidation number / addition of electrons [1] 5 (a) filtration / centrifugation [1] allow: decanting (b) C [1] (c) (i) solvent shown in bottom of beaker; [1] spot on the base line vertically below the spots shown; [1] chromatography paper labelled anywhere; [1] (ii) 4 [1] (d) (i) A [1] (ii) bromine water; [2] decolourises / goes colourless; allow: potassium manganate (VII); decolourises; (iii) substance containing carbon and hydrogen only [1] (iv) ethanoic acid [1] (v) alcohols / alkanols [1]

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2010	0620	22

6	(a)	conduct heat / conduct electricity / shiny / malleable / ductile max [2]	[2]	
	(b)	4	[1]	
	(c)	82 electrons 82 protons 126 neutrons		
	(d)	lead + oxygen $\rightarrow$ lead(II) oxide	[1]	
	(e)	(i) carbon	[1]	
		(ii) gas at room temperature / third box down ticked	[1]	
7	(a)	(i) one of: BMF molecule and diamond a giant covalent structure / BMF has pentagonal (and hexagonal) structure diamond has bent hexagonal or tetrahedral structure / BMF each carbon joined to 3 others, diamond each carbon joined to four others /	[1]	
		(ii) two of:     graphite has (flat) hexagonal rings, diamond has bent hexagonal rings or tetrahedral /     graphite has 3 bonds to each carbon, diamond has 4 /     graphite is layered diamond is not /     graphite has two types of bonding / forces or weak and strong bonds whereas     diamond has only one type of bond / covalent bonds only	[2]	
	(b)	covalent	[1]	
	(c)	layers can slide over each other / forces weak between layers	[1]	
	(d)	cutting / drilling allow: jewellery	[1]	
	(e)	any 2 of: carbon dioxide is a greenhouse gas / absorbs infrared radiation / increases global warming / lead to climate change /	[2]	
	(f)	any two of: sulfur reacts with oxygen (when coal burnt) / forms sulfur dioxide / sulfur dioxide reacts with oxygen (to form sulfur trioxide) / sulfur dioxide or trioxide dissolve in rain (to form acid) /	[2]	

[3]

	Page 5			Mark Scheme: To	eachers' version	Syllabus	Paper
		-		IGCSE – Ma	y/June 2010	0620	22
(!	g)	(i)	wast	gases from digestion in	animals / second box	down ticked	[1]
		(ii)	corre	ct dot and cross diagram	for methane		[1]
		(iii)	etha	e / propane / butane etc			[1]
8 (	a)	calc	ium (	xide			[1]
(1	b)	ther	mal o	ecomposition			[1]
(	c)	cart	on d	oxide has been removed	from the limestone / it	comes from the lime	estone [1]
(	d)	neu	tralisi	ng acid soils / treating ac	idic lakes / flue gas de	sulfurisation etc	[1]
(	e)		•	re of Bunsen / distance	of Bunsen from the tub	oe / amount or mass	of [1]
(1	f)	(i)	calci	ım			[1]
		(ii)	25 c	$1^3$			[1]
		(iii)		m faster than strontium	which is faster than ba	rium / idea of	
				down the group; ct trend i.e. less rapid rea	action the further down	the group; ORA	[2]
(	g)			o carbonate; s or carbon dioxide (evo	lved) through limewate	er / test gas or carbor	1

dioxide with limewater;

limewater goes milky or cloudy;