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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

0654 CO-ORDINATED SCIENCES

0654/22

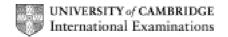
Paper 22 (Core Theory), maximum raw mark 100

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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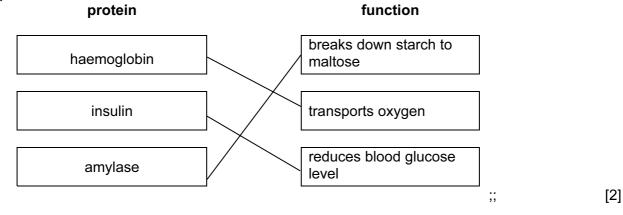
	Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
		IGCSE – May/June 2010	0654	22
1	(a) kinetic;			[1]

[1] (b) uranium, plutonium; (c) (i) cannot be replaced/used up more quickly than they are formed; [1] (ii) solar/sunlight/tides/hydroelectric power/waves/wind/geothermal; [1] (iii) no atmospheric pollution/no polluting gases; no carbon dioxide emissions/greenhouse gases/global warming; no sulfur dioxide emissions/acid rain; less fossil fuels being burned; less solid waste produced; more energy released per kg; [max 1] (d) to reduce heat/energy/power losses; high voltage means low current; lower I²R means less energy lost; [max 2] (e) (i) split/divide/break; [1]

(ii) negatively charged particle/electron; [1]

[Total: 9]

2 (a)



[2] **(b)** carbon, hydrogen, oxygen, nitrogen (one mark for any two correct) ;;

(c) sample A (only); purple with biuret test/positive result with biuret test; [2]

(d) liver; [1]

Page 3				Mark Scheme: Teachers' version	Syllabus	Paper		
				IGCSE – May/June 2010	0654	22		
	(e)	(e) nitrogen fixed/converted to a compound; by, lightning / bacteria/Haber process; ref. to nitrate/ammonium/ammonia; (ignore nitrite) (nitrate/ammonium) taken up through plant roots (must mention roots); (ignore osmosis) used to make, amino acids/proteins (in plant);						
	, ,	415						
3	(a)			rogen/H ₂ ;		[1]		
		(ii)		sodium chloride/common salt/NaC <i>l</i> ; chlorine/C <i>l</i> ₂ ;				
			D –	sodium hydroxide/NaOH ;		[2]		
		(iii)		ducts (electricity) /good conductor; s not react with the electrolyte/unreactive;		[2]		
		(iv)		np) litmus/indicator paper ;		[-]		
		(14)	is bl	eached;		[2]		
				s through bromide/iodide solution; laces other halogen/colour change stated;				
	(b)	(i)	beca elem	rose is the carbohydrate) ause it contains only C, H and O / sucralose content in addition to C, H, O; rence to energy released from sucrose;	ntains chlorine / anothe	r [1]		
		(ii)	42;			[1]		
		(iii)		use less which offsets extra cost;				
			•	equivalent sweetening) fewer kilojoules (consumed health benefit – control of body weight /diabet	•	[max 2]		
						[Total: 11]		
4	(a)	(i)	A ar	nd C ;				
	()	(-)		rall resultant force/unbalanced forces;		[2]		
		(ii)	arro	ws in direction of resultant force;		[1]		
		(iii)	grav	rity (weight) ;		[1]		
		(iv)	the I	Earth ;		[1]		
	(b)	(de	nsitv)	= mass/volume ;				
	,			$0 = 9(g/cm^3);$		[2]		

	Page 4		•	Mark Scheme: Teachers' version	Syllabus	Paper
				IGCSE – May/June 2010	0654	22
	(c)	con con	[3]			
						[Total: 10]
5	(a)	(i)		greater the light intensity, the faster the rate of photo at high light intensities no effect on rate;	osynthesis ;	[2]
		(ii)	ener to m	gy ; ake carbon dioxide combine with water ;		[2]
	(b)	(i)	Q a	upper) epidermis ; ir space ; toma ;		[3]
		(ii)	ells) nore [1]			
		(iii)	this	ices water loss ; leaf is exposed to (more) heat from Sun ; not light poration rate ;	which would incre	ease [max 2]
		(iv)	dow thro	sion ; n concentration gradient ; ugh, stomata/ R ; ugh, air spaces/ Q ;		[max 3]
	(c)	environment; leaves are from the same tree; so have the same genes;				[max 2]
6	(a)	7; 5;				[2]
	(b)	(i)		tube/reaction mixture becomes warm/temperature ause reaction gives off heat;	rises;	[2]
				rease (acid) temperature ;		
				rease acid concentration/strength; er magnesium surface area / less magnesium;		[max 2]
		/;;;\		-		-
		(111)	→ III	agnesium chloride + hydrogen ;;		[2]

	Page 5		<u> </u>	Mark Scheme: Teachers' version	Syllabus	Paper
				IGCSE – May/June 2010	0654	22
	(c)	(i) (mark words separately) metallic reference to typical properties e.g. good conductor / malleable / ductils sonorous/lustrous/high melting point/high boiling point/forms positive ions element contains only one type of atom/found in Periodic Table/other correct;				
		(ii)	bery	rllium/calcium/strontium/barium;		[1]
		(iii)	26 –	· 12 = 14 neutrons ;		[1]
						[Total: 12]
7	(a)	(i)	A to	В;		[1]
		(ii)	50;			[1]
		(iii)		mentum =) mass × velocity ; 00 × 50 = 30000 (kg m/s) ;		[2]
		(iv)		eleration =) gradient (or use numbers); $1/8 = 6.25 \text{ (m/s}^2\text{)}$;		[2]
	(b)	(i)		ning effect =) force × distance ; 3 × 300 = 90 (Nm) ;		[2]
		(ii)		ease force ; ease distance/longer spanner ;		[2]
	(c)	red	and (green – both needed for mark ;		[1]
						[Total: 11]
8	(a)	(red	eptor	s) sound ; r) ear ;) muscle ;		[3]
	(b)	(i)	2 ÷ 3 0.00	330 ; 6 (s) ;		[2]
		(ii)	ring	around results for heat 5;		[1]
		(iii)		8 (no mark) s longer for sound (of gun) to reach lane 8 ;		[1]

Page 6		ge 6			Paper		
				IGCSE – May/June 2010	0654	22	
	(c)	(i)		aking down/releasing energy from, glucose/carbohy out oxygen ;	/drate/other ;	[2]	
		(ii)	lacti	c acid ;		[1]	
		(iii)	in liv ref. 1	to breathing faster ;		[man 0]	
			reī. ī	to oxygen debt ;		[max 2]	
						[Total: 12]	
9	(a)	coo	ls;			[1]	
	(b)	(b) no (elemental) oxygen gas present; oxygen is part of a compound/the water (vapour); compounds have different properties from the elements in them;					
		wat	er pu	its the flame out ;		[max 2]	
	(c)	(i)	(stro	ong) heat/must be fired (in kiln);		[1]	
		(ii)		on dioxide is an acidic oxide / causes (rain)water to of rain ;	be acidic/lowers	the	
				s react with limestone; stone contains (calcium) carbonate (which reacts w	ith acids) ;	[3]	
	(d)	(i)	redu	ns limescale on the element/dishes/inside surfaces uces efficiency of the (heating) element/may cause function;		eat/	
				more detergent ;		[max 1]	
		(ii)	calc	ium/magnesium ;		[1]	
		(iii)	help	s to clean objects/improves washing efficiency/kills	s bacteria ;	[1]	

[Total: 10]