UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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0654 CO-ORDINATED SCIENCES

0654/02

Paper 2 (Core Theory), maximum raw mark 100

This mark scheme is published as an aid to teachers and students, 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2006 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2		Mark Scheme	Syllabu A pe	
		IGCSE - OCT/NOV 2006	0654	
(a)	Hem Nino	s habroptilus D ; naga novaeseelandiae B ; novaeseelandiae E ; a regia C ;	Syllabu 0654 Phocenno [4]	
(b)	(i)	one word is its genus ; other word is its species ;	[2]	
	(ii)	name is Latin and made up of two words;	[1]	
(a)	(i)	ammeter ;	[Total: 7] [1]	
(a)	(i) (ii)	2 coulombs ;	[1]	
	(iii)	R = V/I ; = 12/2 = 6 ohms ;	[2]	
	(iv)	diagram to show clearly that the bulbs are in series ;	[1]	
	(v)	12 ohms ;	[1]	
(b)	(i)	in correct position to control motor and other switches etc ;	[1]	
	(ii)	power = voltage x current ; = 5 x 220 = 1100 W ;	[2]	
			[Total: 9]	
(a)	(i)	rusting not expected in either tube ; rusting requires air/oxygen and water (together) ; nail in A has no water ; nail in B has no air/oxygen ;	[max 3]	
	(ii)	paint would be the barrier of choice ; second mark for a reason why paint is suitable or why one or not ;	r both of the others is [2]	
(b)	(i)	3;	[1]	
	(ii)	chromite reduced since it loses oxygen ; carbon oxidised since it gains oxygen ;		
		or carbon oxidised and chromite reduced; reference to oxygen gain or loss;	[2]	
			[Total: 8]	

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	age 3	Mark Scheme S IGCSE - OCT/NOV 2006	0654 Providence of the second se
(a)	(i)	 A scapula B ulna C humerus ; D tendon ; 	Syllabu 0654 pps (4) [4] [1]
	(ii)	line to space within elbow joint or shoulder joint ;	[1]
	(iii)	lubrication/reduce friction ;	[1]
(b)	(i)	heat/touching the hot object ;	[1]
	(ii)	biceps muscle ;	[1]
	(iii)	as an electrical impulse ; along a nerve/carried by nerve ; along a motor nerve cell ;	[max 2]
	(iv)	relaxes/is stretched ;	[1]
			[Total: 11]
(a)		pha will be absorbed/will not pass through paper ; little/no gamma will be absorbed ;	[2]
(b)	(i)	110 130 150 all required for mark ;	[1]
	(ii)	count is increasing ; so thickness is decreasing ;	[2]
(c)	(i)	to monitor technician's exposure to radiation ; photographic film is sensitive to radiation ; the darker the film goes the greater the exposure ;	[max 2]
	(ii)	fabric will absorb some radiation ;	[1]
(d)	uran	ium, fission, heat, turbines, generators ;;;	[3]
(e)	fossi	I fuels are a finite resource; (accept environmental answers)	[1]
			[Total: 12]
(a)	(i)	group of atoms/more than one atom ; (chemically) bonded/joined ;	[2]
	(ii)	hydrogen ;	[1]
(b)	(i)	 X alanine Y glycine Z lactic acid (all correct); spots for unknowns at the same position/height/travelled same disknown substances; 	stance as [2]
	(ii)	new substances have been made/these are larger molecules so s have changed/joined/other reasonable ;	maller ones [1]
	(iii)	proteins/polypeptides ;	[1]
	(iv)	polymer is much larger/heavier/in the form of long chain/is made o	

(i) label to outer layer ; (ii) no chloroplasts ; (i) lime water ; gees milky ; [2] (ii) respiration ; by yeast (cells) ; glucose combining with oxygen ; [Total: 6] (ii) respiration ; (b) (i) (ii) respiration ; (iii) cyan ; (iii) cyan ; (iii) respiration ; (i) density = mass/volume ; 0.25 kg/dm ² ; [2] (i) density = mass/volume ; 0.25 kg/dm ² ; [2] (ii) 40(N) ; (iii) 40(N) ; (iii) 40(N) ; (iii) 40 col) ; (4 x 10 x 1000) [2] (2] some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; [max 3] (i) ightweight, waterproof, strong, rotproof, unreactive; ; [2] (i) carbon dioxide ; [2] water ; <td< th=""><th>Page 4</th><th>4</th><th></th><th>Ilaba A per</th></td<>	Page 4	4		Ilaba A per
 (ii) respiration; by yeast (cells); glucose combining with oxygen; [Total: 6] (i) blue and green; (1] (ii) cyan; (1] (iii) reflected by fabric; (1] (iii) reflected by fabric; (1] (i) density = mass/volume; 0.25 kg/dm³; (2] (i) 40(N); (1] (ii) 40(N); (1] (ii) 40(N); (1] (iii) 40(N); (1] (ii) 40(N); (1] (ii) 40(N); (1] (iii) 40(N); (1] (ii) 40(N); (2] (iii) 40(N); (2] (iii) 40(N); (2] (ii) 40(N); (2] (iii) 40(N); (2] (ii) 40(N); (3) (4 x 10 x 1000) (2] (2) work = F x D; = 40 000 J; (4 x 10 x 1000) (2] (3) work = F x D; = 40 000 J; (4 x 10 x 1000) (2] (3) lightweight, waterproof, strong, rotproof, unreactive; ; (2] (arbon dioxide; water; (2] (arbon dioxide; mathematic strong comparisons/water will not cause pollution; additional detail e.g. reduced health risks from CO/particulates; (2] (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct; magnesium sulphate is ionic/forms free ions when dissolved; (2) (ii) C or D or E; 			IGCSE - OCT/NOV 2006	0654 73
 (ii) respiration; by yeast (cells); glucose combining with oxygen; [Total: 6] (i) blue and green; (1] (ii) cyan; (1] (iii) reflected by fabric; (1] (iii) reflected by fabric; (1] (i) density = mass/volume; 0.25 kg/dm³; (2] (ii) 40(N); (1] work = F x D; = 40 000 J; (4 x 10 x 1000) (2] (i) work = F x D; = 40 000 J; (4 x 10 x 1000) (2] (2) work = f x D; = 40 000 J; (4 x 10 x 1000) (2] (3) statest molecules ave enough energy to escape; wind carries away water particles; (max 3] (ather the second states is a state of the second state is a state of the second state	(a) (i)	label	to outer layer ;	amb
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[Total: 6] (i) blue and green ; [1] (ii) cyan ; [1] (iii) reflected by fabric ; [1] (i) density = mass/volume ; 0.25 kg/dm ³ ; (i) density = mass/volume ; 0.25 kg/dm ³ ; (ii) 40 (N) ; [1] :) work = F x D; [1] = 40 000 J; (4 x 10 x 1000) [2] (i) (sun's) heat causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; [max 3] i) (sun's) heat causes particles ; [max 3] i) ightweight, waterproof, strong, rotproof, unreactive; ; [2] (i) ightweight, waterproof, strong, rotproof, unreactive; ; [2] (i) carbon dioxide ; [1] (i) carbon dioxide ; [2] (ii) carbon dioxide ; [2] (ii) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; [2]	(ii)			
 (i) blue and green ; (ii) cyan ; (iii) reflected by fabric ; (i) density = mass/volume ; 0.25 kg/dm³; (i) 40(N) ; (i) 40(N) ; (i) 40(N) ; (i) work = F x D; = 40 000 J; (4 x 10 x 1000) (2) work = F x D; = 40 000 J; (4 x 10 x 1000) (2) work = S x D; ad0 causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; (max 3) (i) (gent end to be caused on the cause of the cause of the caused of the ca		gluco	ose combining with oxygen ;	[max 2]
 (ii) cyan; (iii) reflected by fabric; (i) density = mass/volume; 0.25 kg/dm³; (i) 40(N); (i) 40(N); (ii) 40(N); (ii) 40(N); (iii) C or D or E; 				[Total: 6]
 (iii) reflected by fabric ; (i) density = mass/volume ; 0.25 kg/dm³; (i) 40(N); (i) 40(N); (1] (ii) 40(N); (1] (i) work = F x D; = 40 000 J; (4 x 10 x 1000) (2] (3ur's) heat causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; (max 3] (a) ightweight, waterproof, strong, rotproof, unreactive; ; (2] (1) coal methane; (1) carbon dioxide ; water ; (2) reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; (1) (nagnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; (2) (i) C or D or E ; 	(a) (i)	blue	and green ;	[1]
 (i) density = mass/volume ; 0.25 kg/dm³; (ii) 40(N); (iii) 40(N); (iii) 40(N); (1] (a x 10 x 1000) (2] (a x 10 x 1000) (b x 10 x 1000) (c x 10 x 1000) ((ii)	cyan	7	[1]
 0.25 kg/dm³; [2] (ii) 40(N); [1] i) work = F x D; = 40 000 J; (4 x 10 x 1000) [2] i) (sun's) heat causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; [max 3] ii) lightweight, waterproof, strong, rotproof, unreactive; ; [2] iii) coal methane ; [1] ii) coal methane ; [1] iii) carbon dioxide ; water ; [2] iii) reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; [2] iii) (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; [2] (ii) C or D or E ; 	(iii)) refle	cted by fabric ;	[1]
 work = F x D; = 40 000 J; (4 x 10 x 1000) (2) (sun's) heat causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; (max 3] (a) lightweight, waterproof, strong, rotproof, unreactive; ; (2) [Total: 13] (coal methane; (1) carbon dioxide ; water ; (2) reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; (1) (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; (2) (ii) C or D or E ; 	(b) (i)			[2]
 = 40 000 J; (4 x 10 x 1000) (sun's) heat causes particles to move faster ; some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; (max 3] iightweight, waterproof, strong, rotproof, unreactive; ; (2) (Total: 13] (coal methane; (1) coal methane ; (1) carbon dioxide ; water ; (2) reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; (ii) C or D or E ; 	(ii)	40(N);	[1]
 some molecules will be moving faster than others ; only fastest molecules have enough energy to escape ; wind carries away water particles ; lightweight, waterproof, strong, rotproof, unreactive; ; [2] [7otal: 13] coal methane ; [1] carbon dioxide ; water ; carbon dioxide ; reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; (ii) C or D or E ; 	= 4	0 0 00	J;	[2]
 i) lightweight, waterproof, strong, rotproof, unreactive; ; [2] [Total: 13] [1] coal methane; [1] carbon dioxide; water; [2] reference to non-polluting emissions/water will not cause pollution; additional detail e.g. reduced health risks from CO/particulates; [2] (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct; magnesium sulphate is ionic/forms free ions when dissolved; [2] (ii) C or D or E; 	son	ne mo y faste	lecules will be moving faster than others ; est molecules have enough energy to escape ;	[max 3]
 [Total: 13] (arbon dioxide ; water ; (additional detail e.g. reduced health risks from CO/particulates ; (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; (ii) C or D or E ; 				
 (1) <u>coal methane</u>; (1) carbon dioxide; water; (2) reference to non-polluting emissions/water will not cause pollution; additional detail e.g. reduced health risks from CO/particulates; (2) (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct; magnesium sulphate is ionic/forms free ions when dissolved; (i) C or D or E; 	,∼j iigii	itwoigi		
 water ; [2] reference to non-polluting emissions/water will not cause pollution ; additional detail e.g. reduced health risks from CO/particulates ; [2] (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; [2] (ii) C or D or E ; 	(a) <u>coa</u>	<u>al me</u>	ethane ;	
 additional detail e.g. reduced health risks from CO/particulates ; [2] (i) (magnesium sulphate) an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; [2] (ii) C or D or E ; 			oxide ;	[2]
 an electrolyte contains dissolved ions/for cell to work the solution must conduct ; magnesium sulphate is ionic/forms free ions when dissolved ; [2] (ii) C or D or E ; 				[2]
	(d) (i)	an el	ectrolyte contains dissolved ions/for cell to work the solution mu	
	(ii)			[max 2]
[Total: 9]			,	

Pa	nge 5	Mark Scheme	Syllab. Sper
		IGCSE - OCT/NOV 2006	0654
0 (a)	(i)	circle around a flower or the fruit ;	amp
	(ii)	square around one of the little plantlets ;	
(b)	(i)	ovary ;	Syllabu 0654 anacamb [1]
	(ii)	can colonise new areas ; less competition with parent plant ; for light/water/nutrients ;	[max 2]
	(iii)	water ; oxygen ; suitable temperature ;	[3]
			[Total: 8]
11 (a)	(i)	 water only in both 2 and 3; 2 spaced (three to five particles); 3 random and close (at least eight particles); 	[3]
	(ii)	add (acidified) silver nitrate (solution) ; (positive test for chloride ions is) white precipitate ;	[2]
(b)	(i)	removes insoluble material/reasonable example of ;	[1]
	(ii)	chlorine/ozone ;	[1]
	(iii)	lime/calcium carbonate/probably have to accept any correct ; because water is acidic ;	[2]
			[Total: 9]