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## 0654 CO-ORDINATED SCIENCES

0654/03

Paper 3, maximum 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 initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published Report on the Examination.

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 minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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

CIE is publishing the mark schemes for the November 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

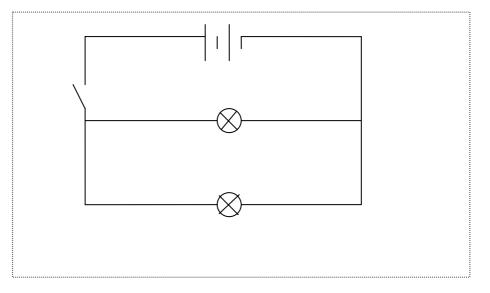
(ii) sound/ultrasound ; [7] (iii) infra-red ; [7] (iii) infra-red ; [7] so distance = 160m ; [7] (i) $d = s x t = 1600 x 0.2 = 320m$ ; so distance = 160m ; [7] (ii) $v = f x \lambda$ ; so $f = v/\lambda = 1600/0.2$ ; = 8000 Hz; [7] (a) (i) left atrium ; [7] (ii) label correctly placed ; [7] (iii) label correctly placed ; [7] (b) oxygen needed for respiration ; supplies energy ; for muscle contraction ; [7] (c) (i) chance is greater as you get older ; steady increase/use of figures ; [7] (ii) 1 smoking increases the risk of having a heart attack ; 2 (almost) doubles the risk/giving up smoking would halve the risk ; 3 diabetes increases the risk of having a heart attack ; 4 so her risk is already very high ; 5 you can't give up diabetes but you can give up smoking to fat ; [7] (iii) taking more exercise/less (saturated) fat in diet/not being too fat ; [7] (iii) (each ion) gains one electron ; [7] (b) water reacts (with lithium) to form hydrogen ; hydrogen is a flammable gas/hydrogen could cause explosion/owtte ; [7] (c) (i) $CO_3^{2^2}$ ; 2- needed to balance the positive charges on two Li <sup>*</sup> ions ; [7] (ii) 7 crew x 18 (= 126 moles) ;	Pa	ge 1	Mark Scheme Syllabus	and the	
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<ul> <li>hydrogen is a flammable gas/hydrogen could cause explosion/owtte;</li> <li>(c) (i) CO<sub>3</sub><sup>2-</sup>;</li> <li>2- needed to balance the positive charges on two Li<sup>+</sup> ions;</li> <li>(ii) 7 crew x 18 (= 126 moles);</li> </ul>		(ii)	(each ion) gains one electron ;	[1]	
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(ii) 7 crew x 18 (= 126 moles);	•	,		[2]	
		(ii)			
		()		[2]	

Pa	age 2	Mark Scheme Sy	llabus 🔗 r
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			am
	(iii	) use of 2:1 ratio in equation so 1260 x 2 (= 2520 moles of Lir required) ;	<b>Иаbus</b> 0654 ОН ; [3]
		calculate molar mass LiOH = 7 + 16 + 1 = 24 g ;	
		calculate total mass of LiOH = 2520 x 24 =60480 g/60.5 kg	; [3]
	(iv	same number of moles of any other would have greater ma	SS ;
		reference to the need to reduce mass to minimum ;	[2]
			Total [13]
(a	a) (i)	increasing, velocity/speed ;	[1]
	(ii)	less than 20N ;	
	()	overall downward force ;	[2]
	(iii	F = m x a  10 = 2 x a;	
	(	$a = 5 m/s^2$ ;	[2]
(1	b) (i)	20N ;	
(-	~, (-)	forces are balanced ;	[2]
	(ii)	air resistance increases as speed increases ;	[1]
	(iii		
	(III)	$= 50 \text{ N/m}^2$ ;	[2]
			Total [10]
(8	a) (i)		[0]
		B slackens/becomes looser ; (not 'relaxes')	[2]
	(::)	refracts light ;	
	(ii)	light (rays) from near object diverge (more) ;	
		need to be, refracted more/bent inward more, to focus onto	retina ·
		fatter lens, refracts/bends, more ;	max [3]
(b)	b) (!)	parents are Bb and Bb ;	
	b) (i)	gametes B and b from both parents ;	
		offspring shown as BB, Bb, Bb (or bB) and bb ;	
		yellow-eyed offspring identified as bb ;	max [3]
	(;;)		
	(ii)		[1]
	(iii		
		DNA/genes/mutation, only altered in iris cells ;	[2]

Total [11]

Р	age 3	3	Mark Scheme Syllabu	bus of r
			IGCSE – November 2005 065	54 200
				bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 54 bus 55 bus 5 bus 55 bus 55 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 bus 5 b
<b>5</b> (	(a)	(i)	appearance of liquid (in Tube <b>B</b> ) ;	10
			limewater becoming cloudy/gas formed ;	
(	(b)		water;	
			elements 2 x H and 1 x O required to balance/owtte ;	[2]
(	(c)	(i)	precipitation/double decomposition ;	[1]
		(ii)	hardness caused by <u>soluble</u> calcium (ions)/calcium chloride ;	
			calcium precipitated/converted into insoluble form ;	[2]
(	(d)		reference to giant structures ;	
			strong chemical bonds must be broken (to melt) ;	
			very many (strong) bonds must be broken (to melt) ;	
			this requires much (heat) energy ;	max [3]
				Total [10]
7 (	(a)	(i)	correct symbols for lamps, battery and switch ;	
			lamps connected in parallel ;	
			lamps connected in parallel;	

switch controls both lamps ;



[3]

[2]

- (ii) electricity can still flow <u>through</u> the other lamps/still a complete circuit [1] through the other lamps ;
- (iii) working;

12 A ;

(alternating current) produces <u>changing</u> magnetic field;
 (changing magnetic field) attracts/repels, permanent magnet;
 causes movement in, coil/wires;

Page	e 4		llabus ??
		IGCSE – November 2005 0	0654 <sup>1</sup> /3 <sub>2</sub> C
(-)	(1)	more particles ;	Tilabus 0654 108Compting
(c)	(i)	to collide with walls of tyre ;	
	(ii)	(heat energy makes) particles move faster ;	
	(,	collide with walls of tyre more often ;	[2]
			Total [13]
(a)		A and B: the more light the faster the rate of photosynthesis	\$;
•••		light is a <u>limiting factor</u> ;	
		B and C: plant unable to make use of extra light ;	max [3]
		something else is now limiting rate ;	
(b)	(i)	methane + oxygen $\rightarrow$ carbon dioxide + water ;	[1]
	(ii)	supplies (extra) carbon dioxide ;	
	~ /	increases temperature ;	[2]
(c)	(i)	ammonium salt/named nitrate ;	[1]
	(ii)	needed for protein synthesis ;	
	~ /	proteins needed for, making new cells/enzymes/other name	ed function
		;	max [2]
		nitrogen may be in short supply ;	
	(iii)	leach into the water ;	
	<b>`</b>	cause, algal bloom/growth of plants ;	
		blocks light ;	
		plants die and are fed on by bacteria ;	
		which use up oxygen ;	
		so animals cannot get oxygen and, die/leave ;	max [3]
			Total [12]

