

NOVEMBER 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 110

SYLLABUS/COMPONENT: 0654/3

CO-ORDINATED SCIENCES (EXTENDED)



UNIVERSITY of CAMBRIDGE Local Examinations Syndicate

 1 (a) (i) C + E because they have the same number of outer electrons; (ii) A as it has a, full outer shell / stable electronic structure; (iii) D as it has seven outer electrons / needs one more to complete outer shell; (b) (i) N₂ + 3H₂ → 2NH₃; (ii) hydrogen / nitrogen; not all reactants react / reversible reaction; or oxides of carbon; produced by earlier processing; or named noble gas; present in air and does not react; (c) (i) HNO₃; (ii) oxygen; (d) (i) neutralisation; (ii) HPO_a²; overall charge must be zero; 2 (a) (i) nucleus / chromosomes; (ii) ionising radiation / named ionising radiation / radioactivity / cigarette smoking; (iii) this is where, gametes / sperm, are formed; mutation in one cell is not enough to affect the man; offspring may contain mutation in <u>all</u> cells; (b) (i) in nucleus; that passes along pollen tube; through style; (iii) parents Aa Aa Aa aa; offspring AA Aa Aa aa; (iii) parents Aa Aa Aa Aa aa; (iii) parents Aa Aa Aa aa; (iii) parents Aa Aa Aa Aa aa; (iii) parents Aa Aa Aa aa; (iii) parents Aand a Aand a; (iii)	Page 1 of 4		Mark Scheme	Syllabus	Paper
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	3 (a)	rotation c rotation to electricity detail:	ould produce electricity or electricity could produce rotation; o electricity is generator; to rotation is motor;		[4]
(D) III - needs to be alternating current / magnetic tield not changing.	(b) <i>(</i> i)	needs to	be alternating current / magnetic field not changing.		[1]
(ii) current changes / voltage changes / magnetic field changes:	(ii)	current ch	nanges / voltage changes / magnetic field changes		[1]

Page 2 of 4		Mark Scheme Sylla	Syllabus	Paper	
		IGCSE Examinations – November 2001 06	54	3	
(a) (i)	fractional distillation;				
(ii)	expect correct terminology gasoline less dense; less viscous; lower boiling point; more flammable				
(b)	add to bromine (water); becomes colourless ; shows alkenes are present;				
(c)	working; 32g;				
(d)	removed from environment more quickly as it is biodegradable; less CO emissions so less health hazard to, humans / animals; as CO, reduces capacity of blood to carry oxygen / combines with Hb; less sulphur dioxide produced / less acid rain; ref. to specific environmental problem caused by, sulphur dioxide / acid rain;				
(a)	idea that there are 1000 mg in one gram; 100 times;				
(b)	carbohydrate; animals do not store carbohydrate / only plants contain starch / ref. to cellulose cell walls;			[2]	
(c) (i)	fats; proteins;			[2]	
(ii)	respiration; glucose, combined with oxygen / oxidised; <i>not 'burnt'</i> to produce water and carbon dioxide;				
(d)	lipase; in small ir breaks do bile (salts	ntestine / duodenum / ileum; own fats to fatty acids and glycerol; a) emulsify fats;		[max 3]	
(e) (i)	more cabbage can grow (in a particular area) than chickens; energy lost between trophic levels; so less biomass possible at higher trophic levels;				
(ii)	animals u animal for anim named ex people ca animal for climate / f	used for purposes other than food; ods provide nutrients not obtainable from plant foods / nal foods richer in some nutrients than plant foods; kamples;; (e.g. calcium from milk, iron from meat) annot eat grass (but some animals can); ods can be eaten in winter when plant foods not available; terrain, may be unsuitable for growing plants;		[max 2]	

Page 3 of 4		Mark Scheme	Syllabus	Paper
		IGCSE Examinations – November 2001	0654	3
6 (a)	mouse travels $5 \times 8 = 40$ m; cat travels $0.5 \times 8 \times 10 = 40$ m;			[2]
(b)	work = force x distance; 20 x 2 = 40J; jump is 100% efficient / no air resistance;			[3]
(c) (i)	clockwise working; 50cm;	force x distance = anticlockwise force x distance;		[3]
(ii)	moment / beam tips	turning force, of cat decreases; not 'momentum', not 'force down on mouse's side;		[2]
7 (a) (i)	covalent;			[1]
(ii)	6 electror correctly	ns on each O and 4 on C; <i>must be able to tell which are whic</i> shared pairs;	ch	[2]
(b)	reaction, enzyme, denatured	slows / stops, at high temperature; less efficient / does not work, at high temperature; d; <i>not 'killed</i> '		[max 2]
(c) (i)	equal <u>vol</u> addition c until mixtu ref. to acc the wine	umes of the wines; <i>not 'amount'</i> of alkali to each in a controlled manner; ure is neutral; curate method of detecting neutrality (<i>not UI</i>); requiring the greater volume of alkali is the more acidic;		[max 4]
(ii)	0.04 x 15 6g;	Ο;		[2]
(d)	redox / ox oxygen ha	kidation; as been gained by ethanol;		[2]
8 (a) (i)	number /	amount, of waves / oscillations, per, second / unit time;		[1]
(ii)	waveleng working; 0.03 m; <i>a</i>	th = velocity ÷ frequency; <i>llow e.c.f. if megahertz incorrectly dealt with</i>		[3]
(iii)	time = dis 3.3 x 10 ⁻⁵	stance ÷ speed; s; allow other correct units, e.g03 ms		[2]
(b)	digital is s analogue	series of pulses / off and on; continuous range of values;		[2]
(c)	light totall diagram s explanation	y internally reflected (stated); showing this on in terms of critical angle;		[max 2]

Page 4 of 4			Mark Scheme	Syllabus	Paper	
			IGCSE Examinations – November 2001	0654	3	
9 (a)	A B C	corne optic iris;	ea / conjunctiva; nerve; allow 'optical nerve', not 'optic fibre'		[3]	
(b)	two straight lines leaving top of flame; refracting inwards at the cornea / lens; <i>not if going through the iris</i> focus on retina;					
(c)	lens is made thinner; ciliary muscles relax; increasing tension on suspensory ligament; <i>not ligaments 'contract'</i>					
(d)	no c cone	ones es use	/ only rods, in this part of the retina; ed for colour vision / rods only see in black and white;		[2]	
10 (a) (i)	P; all c	urrent	t passes through;		[2]	
(ii)	Q; grea	iter re	sistance in this part of branched circuit;		[2]	
(b) (i)	1.5 \ 3.0 \	V; V;			[2]	
(ii)	resis 15 o	stance hms;	e = voltage ÷ current; allow e.c.f. from (i)		[2]	
(iii)	form 10 o	iula o hms;	r working; allow e.c.f. from (i) and (ii)		[2]	