As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	Mark Scheme	Principal Examiner's Report
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?

Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

MARK SCHEME for the October/November 2007 question paper

0610 BIOLOGY

0610/03

Paper 3 (Extended 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.

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.

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

CIE is publishing the mark schemes for the October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



UNIVERSITY of CAMBRIDGE International Examinations

Page 2		Mark Schem	e	Syllabus	Paper
		IGCSE – October/Nove		0610	03
1 (a) (i)	cellu (sap nucl nucl mito endo	roplasts ; R chlorophyll <u>llose</u> cell wall ; A 'not made of, o / large / permanent) vacuole(s) eus / nuclear membrane / nucle eolus ; chondria ; oplasmic reticulum / Golgi ; loplasts ; A starch, grains / gra	, murein / peptidogly); A tonoplast ear envelope; R DN	can'	
(ii)) men cyto ribos chro glyco	e than one chromosome / linear nbrane ; plasm ; somes ; mosomes ; A 'strands of DNA ogen granules ; roplets ;		d	[4] [max 2]
yc sc br ale Qu	cheese ; yoghurt ; sour milk ; bread ; alcohol / any named alcoholic drink ; Quorn / mycoprotein ; single cell protein ;		tofu ; soya sauce ; sauerkraut ; vinegar ; tapai ; tempe / tempeh ; kimchee ;		[max 2]
(c) <i>re</i> 1 2 3 4 5	muta stror <u>antik</u> antik	ation / mutant ; nger wall / less permeable wall / <u>piotic kills</u> bacteria except those piotic is, selective agent / AW ; istant) bacteria reproduce ; <i>ign</i>	enzyme to breakdo that are , mutant / re A ref to (natural) se	wn antibiotic / AW ; esistant ;	[max 3]
(d) th 1 2 3 4 5 6 7 8	fast iden sma sing copy mak have usec A	be answered with reference to reproduction rate / AW ; tical offspring / cloning ; Il number of genes ; le cells ; / / use, genes from, other organ es, protein / named protein, from e plasmids ; d to transfer gene(s) into bacteri DNA for gene product / protein, taken from, h	isms / viruses ; n another organism a / easy to put gene	(s) in bacteria ;	[max 2]
					[Total: 13

First variant Mark Scheme

Page 3		Mark Scheme	Syllabus	Paper
		IGCSE – October/November 2007	0610	03
pressure pain / sh		rature / heat / cold ; ire ; sharpness ; e / touch ;		[max 2
(b) gan grey		; ter (of spinal cord) ;		[2
(c) (i)	Α	rical ; electrochemical / movement of ions / electric curren electrons / electricity	t	[1
(ii)	myel	in / (fatty) sheath ;		[1
(iii)	if not • cc • in • no • in 1.5 /	rd two marks if correct answer with units is given t, award one mark if prrect answer with no units correct answer with correct units o answer but correct working correct answer but correct working 0.02 ; netres per second or m/s or m s ⁻¹ or m sec ⁻¹ ;		[2
(iv)	syna	pse(s) / gap(s) (between neurones) ;		[1
(d) (i)	•	biceps) contracts ; / elbow, flexes / bends / pulls away from stimulus / /	AW ;	[2
(ii)		v ecf from (i) iscle not identified assume it is V		
	muso A r	os (muscle) / (muscle) W / antagonistic muscle / op cle V relaxes / passive stretching of V ; ref to W as antagonistic if already said it contracts V relaxes that causes contraction of W'	posing muscle, co	ntracts ; [2
				[Total: 13

First variant Mark Scheme

	IGCSE – October/November 2007		
		0610	03
A 'mac / harmful	•	ions ;	[3
acce	pt letter written on the structure (no label line) or ne		
<i>glon</i> R or	nerulus but not anywhere else on tubule renal artery including after it divides ;	nd stippled medulla	; allow o
0 01			ľ
due ref to sma two	to the heart / AW ; o capillaries ; A glomerulus Il molecules forced out (of blood) ; examples ; urea, water, amino acids, glucose / sugar, salts / ior	ns / minerals, uric a	cid, ammonia
Α	any two named, ions / hormones as the two exampl	es	[max 3
ii) gluc	ose mark only the first two answers if more than tw	vo given	
<u>activ</u>	<u>e</u> uptake / <u>active</u> transport ;		
wate	er mark only the first answer if more than one giver	ז	
osm	osis ; A diffusion		[3
			[Total: 12
	 harmful / substance (i) accea accea reject F or glom R on U on ii) ref to due ref to smal two of A a ii) gluct diffu: activ A se wate 	 harmful / toxic / poisonous / AW ; substance(s) in excess of requirements ; (i) accept statements from the question instead of letter accept letter written on the structure (no label line) or nereject if letter used on two or more areas and one is income glomerulus but not anywhere else on tubule R on renal artery including after it divides ; U on ureter ; ii) ref to blood pressure ; due to the heart / AW ; ref to capillaries ; A glomerulus small molecules forced out (of blood) ; two examples ; urea, water, amino acids, glucose / sugar, salts / ioi any named hormone / spent hormone A any two named, ions / hormones as the two example ii) glucose mark only the first two answers if more than two diffusion ; active uptake / active transport ; A selective , reabsorption / uptake ; [max 2] 	 harmful / toxic / poisonous / AW ; substance(s) in excess of requirements ; (i) accept statements from the question instead of letter accept letter written on the structure (no label line) or nearby if clear reject if letter used on two or more areas and one is incorrect F on cortex / white area between fibrous capsule and stippled medulla glomerulus but not anywhere else on tubule R on renal artery including after it divides ; U on ureter ; ii) ref to blood pressure ; due to the heart / AW ; ref to capillaries ; A glomerulus small molecules forced out (of blood) ; two examples ; urea, water, amino acids, glucose / sugar, salts / ions / minerals, uric are any named hormone / spent hormone A any two named, ions / hormones as the two examples ii) glucose mark only the first two answers if more than two given diffusion ; active uptake / active transport ; A selective , reabsorption / uptake ; [max 2] water mark only the first answer if more than one given

	Pa	ge 5	Mark Scheme		Syllabus	Paper	
			IGCSE – October/November	r 2007	0610	03	
4	(a)	(is cut or (produce	sperm are stored before ejaculation) r tied during a vasectomy) es fluid for sperm to swim in) neiosis occurs)	E ; B ; C ; F ;		[4]	
	(b)	(i) <u>uret</u>	<u>hra</u> ;			[1]	
		diffic pain nee drib	action in flow of urine / difficult to urina cult to empty bladder ; (when urinating) ; ding to urinate more often ; bling / spraying, of urine ; eased risk of infections of, bladder / ki cult to ejaculate ; A difficulty in releas	dney / prostat		[max 2]	
	(c)	many ex	camples that candidates may give				
			structure ; neter is reduced ; ;			[3]	
	(d)	causes t increase ref to in <i>female</i> <i>male</i>	H / clomiphene / clomid ; R oestroger he ovaries to produce more eggs / AV es chance of fertilisation ; vitro fertilisation ;	V; n, to thicken;	A maintains lining		
			stimulates sperm production ; I methods of birth control		max 3		
		oestrogen / progesterone ; (contraceptive) <u>pill</u> / patch / injection / implant ; R tablet / medicine prevents FSH release / AW ; prevents, egg / follicle, development ; prevents, ovulation / release of eggs ; A no egg to be fertilised (progesterone only pills) inhibit sperm movement through cervix / plug of mucus at cervix ; prevents implantation ;					
		kills spei	rm in, vagina / cervix ; s sperm, reaching egg / entering ovidu	ct ;	max 3	[6]	
						[Total: 16]	

Page 6			rk Scheme	2007	Syllabus 0610	Paper
(-) (i)		IGCSE – Oct	ober/November	2007	0010	03
(a) (i)	bo	bil the leaf in water				
				to test for s	starch	
		l the leaft in ethanol cohol)		to break do membranes		
	SO	ak the leaf in water	t	o remove ch	lorophyll	
		d iodine solution to , e leaf		to soften th	e leaf	
(ii)	chlo	rophyll masks the col	our change (show	n with iodine	e) / AW ;	

 b) light ; water ; A moisture suitable temperature ; R heat chlorophyll ;

(c) to show that the factor under test is responsible for the change observed / AW;	
e.g. to show carbon dioxide is needed	
to show plants can photosynthesis under the glass cover	
A so there is only one variable	[1]

(d) to be sure that starch is produced during the experiment ; [1]

(e) correct result for starch test and reason needed for each mark reject crossed ticks

stage	leaf from plant	starch test (✓ or ×)	reason
2	A and B	×	plants have had no light for photosynthesis / destarched / AW ;
_	Α	×	plant has had no carbon dioxide for photosynthesis ;
4	В	✓	plant has had, carbon dioxide / all conditions, for <u>photosynthesis</u> ;

[max 2]

Pa	ge 7	Mark Scheme	Syllabus	Paper
		IGCSE – October/November 2007	0610	03
(f)	plant res carbon d	ynthesis ; ires ; R 'plant begins to respire' / 'instead it re oxide produced ; A correct equation for aerobi oxide, released / diffuses, from plant ;		[max 3]
				[Total: 15]
(a)		y / (all) organisms / animals and plants / (all) sp ether) in same, area / place / environment; R itats ;		s / AW ;
	interactir	g / interdependent / AW ; A food chains / food with) abiotic / physical / non-living, factors / fea		[max 2]
(b)		de excellent food for humans ; de, sport / fishing, for tourists ;		[2]
(c)	(produce (herbivor (carnivor) cichlid fish + prawns ;		[3]
(d)	2 less 3 (ther 4 plan 5 (aero 6 use	grow / plants grow ; A algal bloom ght for, plants / photosynthesis ; A more com- efore) plants die ; s stop producing oxygen ; bic) bacteria / decomposers, feed on dead plan p oxygen (in respiration) / ref to aerobic ; evels of oxygen cause fish to, die / suffocate ;	nts ;	on to breathe /
	AW		A not chough oxyg	
	8 bact	ria produce toxins which cause fish to die ;		[max 4]
				[Total: 11]

Page 8		Mark Scheme		Syllabus	Paper
		IGCSE – October/Novem	per 2007	0610	03
1 (a)	((r r r e	hloroplasts; R chlorophyll <u>ellulose</u> cell wall; A 'not made of, mu sap / large / permanent) vacuole(s); nucleus / nuclear membrane / nuclear of nucleolus; nitochondria; endoplasmic reticulum / Golgi; myloplasts; A starch, grains / granul nore than one chromosome / linear ch	A tonoplast envelope ; R DNA es		[4]
	(ii) r c r c c	nembrane ; ytoplasm ; ibosomes ; hromosomes ; A 'strands of DNA' F lycogen granules ; il droplets ;			["] [max 2]
(b)	cheese ; yoghurt ; sour milk ; bread ; alcohol / any named alcoholic drink ; Quorn / mycoprotein ; single cell protein ;		u ; ya sauce ; uerkraut ; negar ; pai ; npe / tempeh ; nchee ;		[max 2]
(c)	1 r 2 s 3 <u>a</u> 4 a	t bacteria becoming immune and antib nutation / mutant ; tronger wall / less permeable wall / en <u>intibiotic kills</u> bacteria except those tha intibiotic is, selective agent / AW ; A i resistant) bacteria reproduce ; <i>ignore</i>	zyme to breakdow it are , mutant / res ref to (natural) sele	n antibiotic / AW ; istant ;	[max 3]
(d)	1 fi 2 iv 3 s 4 s 5 c 6 r 7 h	hay be answered with reference to inst ast reproduction rate / AW ; dentical offspring / cloning ; mall number of genes ; ingle cells ; copy / use, genes from, other organism nakes, protein / named protein, from a lave plasmids ; used to transfer gene(s) into bacteria / A DNA for gene R product / protein, taken from, hum	is / viruses ; nother organism ; easy to put gene(s	-	[max 2] [Total: 13]

	Pa	ge 9)	Mark Scheme	Syllabus	Paper
				IGCSE – October/November 2007 061		03
2	(a)	(i)	amy dige wate lubri	luce / secrete, saliva ; R excrete lase / ptyalin ; sts / breaks down, starch (to maltose) ; er for, enzyme action / hydrolysis ; cates / softens, food (to make it easier to chew) ; o pH ;		[max 3]
		(ii)	surfa for e	ding / chewing / crushing, food to reduce particle siz ace area increases ; enzymes ;	е;	
			mak	es swallowing easier ;		[max 3]
	(b)	pro acio der	duce d, dise ntine i	feed on / respire, sugars ; A sweets / sugary drink acid ; R 'sugar turns to acid' / 'sugar is acidic' solves / AW, enamel ; s exposed ; softer / dissolves more rapidly, (than enamel) ;	xs / AW	[max 3]
	(c)	(flu	oride) hardens / strengthens, <u>enamel</u> ;		[1]
	(d)	car fluc onl unk fluc	oride o pride o y ben nowr pride,	o not have a choice if fluoride is in the water / AW ; ose to use toothpaste with fluoride instead ; can cause, mottling / discolouring, of teeth ; efits children / does not benefit adults ; n effects / side effects / harmful to health / poisonous 'not healthy' ecome, weaker / more brittle ;	s in large amounts	; A allergic to
		ma	y cau	se bone cancer (in boys) ;		_
		ref	to cos	st ;		[max 3]

[Total: 13]

Second variant Mark Scheme

	Page 1	0	Mark Scheme	Syllabus	Paper
			IGCSE – October/November 2007	0610	03
3	(a) rer / hai sul	[3]			
	(b) (i)	acce	ept statements from the question instead of let ept letter written on the structure (no label line, ct if letter used on two or more areas and one) or nearby if clear	
		<i>glon</i> R or	n cortex / white area between fibrous capsu nerulus but not anywhere else on tubule n renal artery <i>including after it divides</i> ; n ureter ;	ule and stippled medulla	; allow on
	(ii)	ref to due ref to sma two	o blood pressure ; to the heart / AW ; o capillaries ; A glomerulus all molecules forced out (of blood) ; examples ; urea, water, amino acids, glucose / sugar, sal any named hormone / spent hormone	ts / ions / minerals, uric ad	
		Α	any two named, ions / hormones as the two e	xamples	[max 3]
	(iii)	gluc	cose mark only the first two answers if more t	han two given	
		<u>activ</u>	usion ; <u>ve</u> uptake / <u>active</u> transport ; <u>elective</u> , reabsorption / uptake ; [max 2]		
		wate	er mark only the first answer if more than one	e given	
		osm	nosis; A diffusion		[3]
					[Total: 12]

	Pad	ge 11	Mark Scheme			Syllabus	Paper	
			IGCSE –	October/Novemb	er 2007	0610	03	
4	(a)	(is cut c (produc	perm are stored b tied during a vas s fluid for sperm t neiosis occurs)	• /	E ; B ; C ; F ;		[4]	
	(b)	(i) <u>ure</u>	hra;				[1]	
		diff pai nee drik incl	cult to empty blade (when urinating) ding to urinate mo bling / spraying, o eased risk of infect	; pre often ;	kidney / prostat		[max 2]	
	(c)	many e	amples that cand	idates may give				
			tructure ; neter is reduced ; ;				[3]	
	(d)	causes increas	I / clomiphene / cl he ovaries to proc s chance of fertilis vitro fertilisation ; hCG ; stimulates follicle progesterone ; causes, lining of u increases chance hCG ;	s to <u>release</u> eggs ; uterus / endometriu of implantation ; sterone production terone ;	.W ; ım, to thicken ;	A maintains lining max 3		
		chemical methods of birth control oestrogen / progesterone ; (contraceptive) <u>pill</u> / patch / injection / implant ; R tablet / medicine prevents FSH release / AW ; prevents, egg / follicle, development ; prevents, ovulation / release of eggs ; A no egg to be fertilised (progesterone only pills) inhibit sperm movement through cervix / plug of mucus at cervix ; prevents implantation ;						
			m in, vagina / cer sperm, reaching	vix ; egg / entering ovid	luct ;	max 3	[6]	
							[Total: 16]	

	Page 12		2	Mark Scheme	Syllabus	Paper
		<u>je</u>	-	IGCSE – October/November 2007	0610	03
5	(a)		a that gaseous exchange surface is ce where gases move between organism and its environment ;			[1]
	(b)	сар	illary	e cell thick / short distance; A ref to, cuticle / epide / blood, near to, surface / epidermis ; ssolve in layer of, water / mucus ;	ermis	[max 2]
	(c)	(i)	activ prov vacu wate hydr	ens testa ; vation of enzymes ; vide medium for transport / AW ; uolation of cells ; A ref to cytoplasm er is a solvent ; rolysis / breakdown of, food stores ; involved in reactions R photosynthesis		[max 1]
		(ii)	form to m trans activ	vth / development (of plumule / radicle / cells) ; nation of, cytoplasm / organelles / membranes / cell netabolise food stores / AW ; sport ; /e uptake of, minerals / ions ; division / mitosis ;	walls / named mole	cule ; [max 1]
	(d)	(i)	due carb volu redu	bil droplet) moves, towards the peas / to the left / tow to uptake of oxygen by seeds ; bon dioxide produced is absorbed by soda lime ; me of oxygen absorbed = volume of carbon dioxide action in gas volume in boiling tube ; action in pressure of gas in tube ;		[max 3]
		(ii)	2 a 3 m 4 o 5 ra 6 re 7 re	arry out at, different temperatures / stated temperature llow peas to adjust to (new) temperature ; neasure distance travelled by oil droplet ; ver known period of time ; ate = distance divided by time ; A cm min ⁻¹ emove bung to allow fresh air in to apparatus / repla epeats at each temperature ; amed variable to be controlled ; e.g. mass of, seeds	ice soda lime ;	[max 5]
		(iii)	more resp	tic energy influenced by temperature ; e frequent collisions at higher temperatures / fewer o piration is controlled by enzymes / AW ;	collisions at low terr	
			enzy	ymes denatured by high temperatures ;		[max 2]
						[Total: 15]

Second variant Mark Scheme

Page 13	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2007	0610	03
(living tog many hal interactin	ity / (all) organisms / animals and plants / (all) spec gether) in same, area / place / environment; R ha bitats ; g / interdependent / AW ; A food chains / food we with) abiotic / physical / non-living, factors / featur	abitat	is / AW ; [max 2]
	ride excellent food for humans ; ride, sport / fishing, for tourists ;		[2]
(c) (produce (herbivor (carnivor	e) cichlid fish + prawns ;		[3]
2 less 3 (ther 4 plant 5 (aero 6 use o 7 low l AW	e grow / plants grow ; A algal bloom light for, plants / photosynthesis ; A more compe efore) plants die ; ts stop producing oxygen ; obic) bacteria / decomposers, feed on dead plants up oxygen (in respiration) / ref to aerobic ; evels of oxygen cause fish to, die / suffocate ; eria produce toxins which cause fish to die ;	;	en to breathe / [max 4]
			[Total: 11]