MARK SCHEME for the October/November 2012 series

9700 BIOLOGY

9700/23

Paper 2 (AS Structured Questions), maximum raw mark 60

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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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



Page 2	Mark Scheme	Syllabus	Paper
	GCE AS/A LEVEL – October/November 2012	9700	23

Mark scheme abbreviations:

; / R A	separates marking points alternative answers for the same point reject accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
1	ignore
AVP	alternative valid point (examples given)

	Page 3	Mark Scheme	Syllabus Paper			
		GCE AS/A LEVEL – October/November 2012	9700	23		
1	accept first of accept phone					
Α	name	mitochondrion ; A mitochondria				
	function (site	of); <u>ATP</u> , synthesis / production / AW <u>aerobic</u> respiration link reaction Krebs cycle oxidative phosphorylation AVP R ATP energy				
в	name	Golgi (apparatus / body / complex) ; A dictyosome A Golgi				
	<i>function</i> (site	of) ; modification of protein / glycosylation / describe modification of lipid pack(ag)ing (of), protein / lipids production of (Golgi / secretory) vesicles / lysos ignore synthesis of protein (<i>incorrect name</i>) <i>lysosome function</i> = contains / storage of hydro <i>Golgi / secretory, vesicles</i> = transport, protein /	omes lytic / digestive	e, enzymes		
С	name	chloroplast(s) ;				
	<i>function</i> (site	of); photosynthesis light-dependent, reactions / stage (of photosynt light, absorption / AW light-independent, reactions / stage (of photosy Calvin cycle carbon fixation photophosphorylation A ATP synthesis ignore (<i>treat as neutral</i>) <i>ref. to, glucose / oxyge</i> ignore chlorophyll R light / dark, stage / reactions	nthesis)			
D	name	<u>rough</u> endoplasmic reticulum ; R RER or rough ER R endoplastic				
	<i>function</i> (site	of) ; protein / polypeptide, synthesis translation modification of protein / described (e.g. folding) protein transport (to Golgi) <i>(incorrect name)</i> <i>smooth endoplasmic reticulum</i> = lipid / steroid / <i>endoplasmic reticulum</i> = <i>ecf as above for RER</i>	•	nthesis / AW		

[Total: 8]

	Page 4			Mark Scheme	Syllabus	Paper
				GCE AS/A LEVEL – October/November 2012	9700	23
2	(a)			and TB ; any other underlined diseases		[1]
	(b)			swer in context of antibiotics, not antibodies bacteria in answer if not clear in mp 1		
		1 2 3 4 5 6	R vir igno 'all' r (so) (dise no re to re R ide	ensure) all <u>bacteria</u> are, killed / removed / eliminated / de rus / bacteria and virus <i>ore antigen or pathogen or disease</i> <i>may be implied e.g. award if gain mp 2,3,4</i> no reservoir of infection remains / AW / ora ; ease) cannot be transmitted / cannot infect others / AW e ecurrence / disease does not return ; <i>in context of same</i> educe chance of / AW, (antibiotic / drug) resistance deve <i>ea that human becomes resistant to antibiotics</i> to mutation in context of resistance ;	e.g. spread / ora person	; [max 3]
	(c)	(i)	<u>com</u> A sa fewe A no A fev A pr redu	is with / fits into / AW, active site ; R collides with / reacts <u>plementary</u> shape to active site / similar shape to substrate ame shape as substrate / same <i>or</i> similar structure as sub- er, enzyme-substrate / E – S, <u>complexes</u> ; b ESC in context of one enzyme wer successful collisions between enzyme and substrate revents formation of E – S <u>complexes</u> acces rate of / slows (enzyme) reaction ; aduced enzyme activity / A less product formed	ate ; bstrate	[max 3]
		(ii)	(hun A pe peni	ns <i>that</i> nans) do not have the enzyme for cell wall synthesis ; enicillin only inhibits bacterial enzymes icillin will not inhibit any human enzyme ; nan cells) do not have cell walls ;		[max 1]
	A in ref. cell lysis A co bac stop AVI		A inl ref. t cell o lysis A ce bact stop AVP	wall synthesis will stop / slow / be inhibited ; hibit, murein / peptidoglycan, synthesis to uptake of water by osmosis ; cannot withstand osmotic stress / cell cannot withstand t s / bursting / AW ; ell wall weakened teria die / are killed / destroyed ; s bacteria dividing / reproducing / 'replicating' ; ? ; e.g. detail of action of penicillin (e.g. prevents cross-lin hicillin) only works on growing cells		[max 3] [Total: 11]

Page 5	Mark Scheme	Syllabus	Paper
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3 (a) look at quoted data to confirm qualitative statements if unclear

1 people who never smoked have the lowest percentage of deaths (due to lung cancer); must be comparative

for age

2 either

the younger / earlier the person starts smoking the higher the percentage of deaths or

the older / later the person starts smoking the lower the percentage of deaths (due to lung cancer);

for number of cigarettes per day

3 either

increasing / AW, the number of cigarettes smoked per day increases the percentage of deaths

or

decreasing / AW, the number of cigarettes smoked per day decreases the percentage of deaths ;

different 'start' ages for the two types of smokers

- 4 highest percentage deaths is for those with an early start <u>and</u> smoke, 21–39 (cigarettes per day) / the most / AW ;
- 5 greatest difference in percentage deaths occurs in those that start smoking early ; **ora** [max 4]
- (b) (i) 1 forms carboxyhaemoglobin;
 - 2 reduces affinity of Hb for oxygen / Hb has higher affinity for CO than for oxygen ; **ignore** 'picks up CO rather than oxygen', if mp3 is given then allow
 - 3 reduces quantity of oxygen transported (in blood) / AW ; R prevents
 - damages lining of arteries ;
 A promotes / AW, atheroma / atherosclerosis / plaque [max 2]
 - (ii) raises, heart rate / blood pressure ; reduces diameter of arterioles ; decreases blood flow to body extremities ; increases 'stickiness' of platelets / promotes, blood clotting / thrombosis ; [max 2]

	ge 6	5		N	ark Sche	me		Sylla	bus	Paper
			GCE AS	A LEVE	_ – Octob	er/Novemb	er 2012	97		23
	/	achla	taalla							
	(111)	goble		、.						
			ge / swell up come bigger							
		R infl	••	/ ullate						
			ice more / e	vcass m						
		A lots		xcc33, m	ucus,					
			; e.g. any ce	ellular det	ail such as	s more mito	chondria /	Golai boc	lies or v	esicles
			, e.g, e.					<u>-</u>		
		cilia:								
		•	/sis / destru		<i></i> .					
			nages R kill	-						
			ess beating		ig (action)	/ moving m	ucus ;			F A
		R in d	ontext of m	oving air						[max 4
										[Total: 12
										•
		100								
(a)	(×)	<u>Δ()()</u>								
			in corroct or	not to no	areat 100		ork for or	rroot work	ina	
	if a	nswer	incorrect or				nark for co	orrect work	ing	
	<i>if al</i> e.g	<i>nswer</i> . (scale	e bar) 19 00	0–21 000	divided b	y 50	nark for co	orrect work	ing	10
	<i>if al</i> e.g	<i>nswer</i> . (scale		0–21 000	divided b	y 50	nark for co	orrect work	ing	[2
(b)	if al e.g awa	nswer . (scale ard ma	e bar) 19 00 <i>x one mark</i>	0–21 000 if a unit (divided b e.g. μm) is	y 50 s included	nark for co	orrect work	ing	[2
(b)	if al e.g awa	nswer . (scale ard ma thick(e bar) 19 00 <i>x one mark</i> ened) / ligni	0–21 000 <i>if a unit (</i> fied, wall:	divided b e.g. μm) is	y 50 s included	nark for cc	orrect work	ing	[2
(b)	if al e.g awa	nswer . (scale ard ma thick(igno l	e bar) 19 00 <i>x one mark</i>	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i>	divided b e.g. µm) is s prevent,	y 50 s <i>included</i> collapse ;	nark for co	orrect work	ing	[2
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(b)	if ai e.g awa 1	nswer . (scale ard ma thick(igno A wit igno	e bar) 19 00 x one mark ened) / ligni r e strenghte nstands, col	0–21 000 <i>if a unit (</i> fied, walls ned mpression	divided b e.g. μm) is s prevent, n / negativ	y 50 s <i>included</i> collapse ; e pressure			ing	[2
(b)	if an e.g awa	nswer . (scale ard ma thick(igno A wit igno lignifi cellul	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr pose, wall / li	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events leaning, allo	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesio	y 50 s <i>included</i> collapse ; e pressure ovides wate	erproofing	•,	ing	[2
(b)	if ai e.g awa 1	nswer . (scale ard ma thick(<i>igno</i> A wit igno lignifi cellul A hyd	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr pse, wall / li lrogen bond	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events lea ning, allow	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesic ophilic	y 50 s <i>included</i> collapse ; e pressure ovides wate on of water	erproofing (molecule	; s);		[2
(b)	if an e.g awa 1 2 3 4	nswer (scale ard ma thick(ignou A wit ignou lignifi cellul A hyo (relat	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events leaning, allow ling / hydr diameter	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesio rophilic / large cro	y 50 s <i>included</i> collapse ; e pressure ovides wate on of water ss-sectiona	erproofing (molecule	; s);		[2
(b)	if an e.g awa 1 2 3 4 5	nswer (scale ard ma thick(ignor A wit ignor lignifi cellul A hyo (relat hollow	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events lea ning, allow ling / hyde diameter no conten	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesia ophilic / large cro ts / no cyta	y 50 s <i>included</i> collapse ; e pressure ovides wate on of water ss-sectiona oplasm ;	erproofing (molecule	; s);		[2
(b)	if al e.g awa 1 2 3 4 5 6	nswer . (scale ard ma thick(<i>ignot</i> ignot lignifi cellul A hyd (relat hollow no er	e bar) 19 00 x one mark ened) / ligni re strenghtenstands, con re bursting ed (wall), pr ose, wall / li lrogen bond vely) large o v / empty / r d walls / co	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events lea ning, allow ling / hyde diameter no conten	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesia ophilic / large cro ts / no cyta	y 50 s <i>included</i> collapse ; e pressure ovides wate on of water ss-sectiona oplasm ;	erproofing (molecule	; s);		[2
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(b)	if al e.g awa 1 2 3 4 5 6	nswer (scale ard ma thick(ignor A wit ignor lignifi cellul A hyo (relat hollow no er elong A if ro	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r d walls / co ated ; eferenced to	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events leaning, allow ling / hydr diameter no conten ntinuous	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesi vophilic / large cro ts / no cyto tubes' / A vessels A	y 50 s included collapse ; e pressure ovides wate on of water ss-sectiona oplasm ; W ; cells end to	erproofing (molecule I area / wi end (to m	; s) ; de / large nake tubes	lumen ;)	[2
(b)	if al e.g awa 1 2 3 4 5 6	nswer (scale ard ma thick(ignor A wit ignor lignifi cellul A hyd (relat hollow no er elong A if r only a	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r d walls / co ated ; eferenced to allow mps 4	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events leaning, allow ling / hydr diameter no conten ntinuous <i>cells or v</i> -7 <i>in term</i>	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesid rophilic / large cro ts / no cyto tubes' / A vesse/s A as of ease	y 50 s included collapse ; e pressure ovides water on of water ss-sectiona oplasm ; W ; cells end to / <i>efficiency</i>	erproofing (molecule I area / wi end (to m of water r	; s); de / large nake tubes novement	lumen ;)	
(b)	if al e.g awa 1 2 3 4 5 6	nswer (scale ard ma thick(ignor A wit ignor lignifi cellul A hyd (relat hollow no er elong A if re only a mp 4	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r d walls / co ated ; eferenced to allow mps 4 e.g. more s	0–21 000 <i>if a unit (</i> fied, walls <i>ned</i> mpression events leaning, allow ling / hyde diameter to conten ntinuous <i>cells or v</i> <i>-7 in term</i> <i>pace allo</i>	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesia ophilic / large cro ts / no cyta tubes' / A' vessels A ns of ease ws a great	y 50 s included collapse ; e pressure ovides water on of water ss-sectiona oplasm ; W ; cells end to / efficiency ter volume ;	erproofing (molecule I area / wi end (to m of water r to flow / gr	; s); de / large nake tubes novement reater volu	lumen ;) me per	unit time
(b)	if al e.g awa 1 2 3 4 5 6 7	nswer (scale ard ma thick(ignou A wit ignou lignifi cellul A hyd (relat hollow no er elong A if re only a mp 4 or mp	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r d walls / co ated ; eferenced to allow mps 4 e.g. more s o 5–6 e.g. m	0–21 000 if a unit (fied, walls ned mpression events lea ning, allow ling / hyde diameter no conten ntinuous o cells or v -7 in term pace allo inimal res	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesic ophilic / large cro ts / no cyte tubes' / A vesse/s A as of ease ws a great sistance to	y 50 s included collapse ; e pressure ovides wate on of water ss-sectiona oplasm ; W ; cells end to / efficiency ter volume ; o flow, allow	erproofing (molecule I area / wi end (to m of water r to flow / gr	; s); de / large nake tubes novement reater volu	lumen ;) me per	
(b)	if al e.g awa 1 2 3 4 5 6	nswer (scale ard ma thick(ignou A wit ignou lignifi cellul A hyd (relat hollow no er elong A if re only a mp 4 or mp	e bar) 19 00 x one mark ened) / ligni re strenghte nstands, con re bursting ed (wall), pr ose, wall / li lrogen bonc vely) large v / empty / r d walls / co ated ; eferenced to allow mps 4 e.g. more s o 5–6 e.g. m pitted walls,	0–21 000 if a unit (fied, walls ned mpression events lea ning, allow ling / hyde diameter no conten ntinuous o cells or v -7 in term pace allo inimal res	divided b e.g. μm) is s prevent, n / negativ akage / pr ws adhesic ophilic / large cro ts / no cyte tubes' / A vesse/s A as of ease ws a great sistance to	y 50 s included collapse ; e pressure ovides wate on of water ss-sectiona oplasm ; W ; cells end to / efficiency ter volume ; o flow, allow	erproofing (molecule I area / wi end (to m of water r to flow / gr	; s); de / large nake tubes novement reater volu	lumen ;) me per	unit time

GCE AS/A LEVEL – October/November 2012 9700 (c) 1 water moves, down a <u>water potential</u> gradient / from a high(er) water potential to low(er) water potential, accept ψ for water potential; 2 2 apoplast pathway, described / used in correct context; 3 3 symplast pathway, described / used in correct context; 4 4 evaporation from mesophyll cell walls; A surface of mesophyll cells 5 into air space(s); must be linked to evaporation / water vapour 6 water yapour diffuses (out); accept if no vapour but follows from evaporation 7 out / through / via stoma(ta); R 'evaporates from the stomata' 8 AVP; ref. to water leaves unlignified terminals of xylem vessels 5 (a) all points except mp3 may be taken from a labelled/annotated diagram 1 ref. to, attachment / AW, to mRNA ; 2 idea of two codon attachment, sites / space, for six bases or nucleotides ; 3 mRNA has code for sequence of amino acid (two tRNA (molecules) ; 4 (ribosome) provides sites for attachment of two tRNA (molecules) ; 5 (a) all points except mp3 may be taken from a labelled/annotated diagram 1 ref. to, attachment / AW, to	Page 7	ge 7		rk Scheme	Syllabus	Paper
 low(er) water potential, accept ψ for water potential; apoplast pathway, described / used in correct context; symplast pathway, described / used in correct context; evaporation from mesophyll cell walls; A surface of mesophyll cells into air space(s); must be linked to evaporation / water vapour water <u>vapour</u> diffuses (out); accept if no vapour but follows from evaporation out / through / via <u>stoma</u>(ta); R 'evaporates from the stomata' AVP; ref. to water leaves unlignified terminals of xylem vessels 		GCE /	AS/A LEVEL -	- October/November 201		23
 8 AVP ; ref. to water leaves unlignified terminals of xylem vessels (a) all points except mp3 may be taken from a labelled/annotated diagram ref. to, attachment / AW, to mRNA ; <i>idea of</i> two codon attachment, sites / space, for six bases or nucleotides ; mRNA has code for sequence of amino acids (in a polypeptide) ; (ribosome) provides sites for attachment of two tRNA (molecules) ; A implied each tRNA has a specific amino acid / AW ; (mRNA) codon – anticodon (tRNA), binding ; A description in terms of complementary base pairing A 'matching' formation of peptide bonds (catalysed by peptidyl transferase) ; <i>idea of</i> ribosome moving along mRNA one codon at a time ; (b) (i) GGC ; (ii) CTA ; (c) 1 amino acid coded by codon 2 changed ; <i>idea of</i> every subsequent <u>codon</u> changed ; amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed ; <i>idea of</i> premature chain termination (if stop codon further on) / AW ; <i>idea of</i> change in, <u>primary / secondary / tertiary</u>, structure of protein ; <i>idea of</i> protein non-functional ; 	2 3 4 5 6	 low(er) water p apoplast pathw symplast pathw evaporation from A surface of m into air space(see the second s	botential, acce way, described way, described om <u>mesophyll</u> nesophyll cells s); <i>I to evaporatio</i> diffuses (out); <i>pour but follow</i> via <u>stoma(ta)</u>	pt ψ for water potential ; I / used in correct context d / used in correct context <u>cell walls</u> ; n / water vapour ws from evaporation ;	;	ntial to a
 (a) all points except mp3 may be taken from a labelled/annotated diagram ref. to, attachment / AW, to mRNA; <i>idea of</i> two codon attachment, sites / space, for six bases or nucleotides; mRNA has code for sequence of amino acids (in a polypeptide); (ribosome) provides sites for attachment of two tRNA (molecules); A implied each tRNA has a specific amino acid / AW; (mRNA) codon – anticodon (tRNA), binding; A description in terms of complementary base pairing A 'matching' formation of peptide bonds (catalysed by peptidyl transferase); <i>idea of</i> ribosome moving along mRNA one codon at a time; (b) (i) GGC; (ii) CTA; (c) 1 amino acid coded by codon 2 changed; amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed; <i>idea of</i> premature chain termination (if stop codon further on) / AW; <i>idea of</i> protein non-functional; 	Q	•			n vossols	[mov F
 (a) all points except mp3 may be taken from a labelled/annotated diagram ref. to, attachment / AW, to mRNA; <i>idea of</i> two codon attachment, sites / space, for six bases or nucleotides; mRNA has code for sequence of amino acids (in a polypeptide); (ribosome) provides sites for attachment of two tRNA (molecules); A implied each tRNA has a specific amino acid / AW; (mRNA) codon – anticodon (tRNA), binding; A description in terms of complementary base pairing A 'matching' formation of peptide bonds (catalysed by peptidyl transferase); <i>idea of</i> ribosome moving along mRNA one codon at a time; (b) (i) GGC; (ii) CTA; (c) 1 amino acid coded by codon 2 changed; <i>idea of</i> every subsequent <u>codon</u> changed; amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed; <i>idea of</i> premature chain termination (if stop codon further on) / AW; <i>idea of</i> protein non-functional; 	0	O AVF, Tel. 10 W	alei leaves ui		11 vessels	[max 5
 1 ref. to, attachment / ÁW, to mRNA; <i>idea of</i> two codon attachment, sites / space, for six bases <i>or</i> nucleotides; 3 mRNA has code for sequence of amino acids (in a polypeptide); 4 (ribosome) provides sites for attachment of two tRNA (molecules); A implied 5 each tRNA has a specific amino acid / AW; 6 (mRNA) codon – anticodon (tRNA), binding; A description in terms of complementary base pairing A 'matching' 7 formation of peptide bonds (catalysed by peptidyl transferase); <i>idea of</i> ribosome moving along mRNA one codon at a time; (b) (i) GGC; (ii) CTA; (c) 1 amino acid coded by codon 2 changed; 3 amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed; <i>idea of</i> premature chain termination (if stop codon further on) / AW; <i>idea of</i> change in, <u>primary</u> / <u>secondary</u> / <u>tertiary</u>, structure of protein; <i>idea of</i> protein non-functional; 						[Total: 10
 (ii) CTA; (c) 1 amino acid coded by codon 2 changed; 2 <i>idea of</i> every subsequent <u>codon</u> changed; 3 amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed; 4 <i>idea of</i> premature chain termination (if stop codon further on) / AW; 5 <i>idea of</i> change in, <u>primary</u> / <u>secondary</u> / <u>tertiary</u>, structure of protein; 6 <i>idea of</i> protein non-functional; 	1 2 3 4 5 6 7	 ref. to, attachm <i>idea of</i> two cod mRNA has cod (ribosome) pro A implied each tRNA has (mRNA) codon A description in A 'matching' formation of period 	hent / AW, to n don attachmer de for sequenc ovides sites for s a specific am n – anticodon (n terms of con eptide bonds (nRNA ; nt, sites / space, for six ba ce of amino acids (in a pol attachment of two tRNA nino acid / AW ; (tRNA), binding ; nplementary base pairing catalysed by peptidyl trans	ses <i>or</i> nucleotides ; ypeptide) ; (molecules) ; sferase) ;	[max 4
 (ii) CTA; (c) 1 amino acid coded by codon 2 changed; 2 <i>idea of</i> every subsequent <u>codon</u> changed; 3 amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed; 4 <i>idea of</i> premature chain termination (if stop codon further on) / AW; 5 <i>idea of</i> change in, <u>primary</u> / <u>secondary</u> / <u>tertiary</u>, structure of protein; 6 <i>idea of</i> protein non-functional; 	(b) (i)	(i) GGC ;				[1
 (c) 1 amino acid coded by codon 2 changed ; 2 <i>idea of</i> every subsequent <u>codon</u> changed ; 3 amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed ; 4 <i>idea of</i> premature chain termination (if stop codon further on) / AW ; 5 <i>idea of</i> change in, <u>primary</u> / <u>secondary</u> / <u>tertiary</u>, structure of protein ; 6 <i>idea of</i> protein non-functional ; 						
 <i>idea of</i> every subsequent <u>codon</u> changed ; amino acids / protein sequence, up to and including codon 1 unaffected / AW ora amino acid sequence from codon 2 onwards is changed ; <i>idea of</i> premature chain termination (if stop codon further on) / AW ; <i>idea of</i> change in, <u>primary</u> / <u>secondary</u> / <u>tertiary</u>, structure of protein ; <i>idea of</i> protein non-functional ; 	(11)	(II) CTA,				[1
ignore 'affect / effect' A in context of enzyme not functioning	2 3 4 5	 2 idea of every s 3 amino acids / p ora amino acid 4 idea of premat 5 idea of change 6 idea of protein ignore 'affect / 	subsequent <u>co</u> protein sequer d sequence fro ture chain term e in, <u>primary</u> / <u>s</u> non-functiona / effect'	don changed ; nce, up to and including co om codon 2 onwards is ch nination (if stop codon furti secondary / <u>tertiary</u> , struct Il ;	anged ; ner on) / AW ;	AW
R if this point is out of context	-	R if this point is	s out of contex	<t c<="" td=""><td></td><td>r .</td></t>		r .
7 AVP ; e.g. <u>frameshift</u> (mutation)	((AVP ; e.g. <u>tran</u>	<u>nesnitt</u> (mutati	on)		[max 3
						[Total: 9

	Page 8		Mark Scheme	Syllabus	Paper
			GCE AS/A LEVEL – October/November 2012	9700	23
6	(a)	A alterna including interactir and abio in an ide	<u>d</u> abiotic, components / AW ; atives to biotic and abiotic g <i>commumity / AW for biotic and habitat / environment, fo</i> ng / AW ; <i>idea of</i> interactions between organisms <i>or</i> inter tic environment ntifiable / a defined / a self-contained area / place / unit / f place if qualified with correct example	ractions betwe	-
	(b)		ses / shrubs / trees ; ngular or plural		[1]
			er / predatory insect ; ngular or plural		[1]
	(c)	1 ir 2 ir 3&4 e re n e d	oss at each level because of nedible parts / not all of the organism can be eaten ; ndigestible parts / not all is digested / egestion / faeces ; nergy / heat, losses from ;; espiration R energy used for respiration novement A energy used for movement xcretion igestion energy not utilised by plants by e.g. reflection from leave	s, etc.	[max 3]
	(d)	1 decc 2 dige 3 <i>idea</i> 4 dear 5 proc 6 nitrif A fo sign A ni igno igno	a death of organisms or excretion of nitrogenous waste omposers / saprotrophs / bacteria / fungi / scavengers / o st / breakdown / hydrolyse, protein / urea ; of assimilation in / growth of, decomposers / AW ; mination ; luction of ammonium (ions) / ammonification ; A ammon fication described <i>or</i> denitrification described ; rmulae for ammonium ions, nitrite ions and nitrate ions to s trification described in terms of ammonium (ions) to nitrate ore nitrogen fixation as used correctly (N ₂ to fixed N) ore uptake of nitrate ions or ammonium ions by plants not credit nitrification if any confusion with nitrogen fixation	ia / NH₃ out must be col ate (ions)	rrect including [max 3]
					[Total: 10]