MARK SCHEME for the October/November 2012 series

9700 BIOLOGY

9700/23

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

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.



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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 ir ref. cell lysis A c 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]	

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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			Ма	ark Schem	е		Syllabus	Paper
			GCE AS/	A LEVEL	- October	/Novembe	r 2012	9700	23
	/:::\	achla							
	(111)	goble							
		-	e / swell up ome bigger						
		R infla	••	unate					
			ce more / ex	cess mu	cus .				
		A lots			,				
		AVP ;	e.g. any ce	lular deta	il such as r	nore mitoch	iondria / G	olgi bodies or	vesicles
		cilia:							
			sis / destruc						
			ages R kills	-					
			ss beating /		g (action) / I	moving muc	cus ;		
		R in c	ontext of mo	oving air					[max 4
									[Total: 12
(a)	(×)	400 ;;							
(a)		400 ;; nswer i	ncorrect or i	not to nea	rest 100 ali	low one ma	rk for corr	ect working	
(a)	if ar	nswer i	<i>ncorrect or i</i> bar) 19 000				rk for corr	ect working	
(a)	<i>if ar</i> e.g.	<i>iswer i</i> (scale		-21 000	divided by	50	rk for corr	ect working	[2
	if ar e.g. awa	nswer i (scale ard ma.	bar) 19 000 c <i>one mark i</i>	–21 000 f a unit (e	divided by .g. µm) is in	50 ncluded	rk for corr	ect working	[2
(a) (b)	if ar e.g. awa	nswer i (scale ard ma thick(e	bar) 19 000 c one mark i ened) / lignif	–21 000 f a unit (e ied, walls	divided by .g. µm) is in	50 ncluded	rk for corr	ect working	[2
	if ar e.g. awa	nswer i (scale ard ma thick(e ignor	bar) 19 000 c one mark i ened) / lignif e strenghter)–21 000 f a unit (e ied, walls ied	divided by . <i>g. μm) is ii</i> prevent, co	50 ncluded ollapse ;	rk for corr	ect working	[2
	if ar e.g. awa	nswer i (scale ard ma. thick(e ignor A with	bar) 19 000 c one mark i ened) / lignif)–21 000 f a unit (e ied, walls ied	divided by . <i>g. μm) is ii</i> prevent, co	50 ncluded ollapse ;	rk for corr	ect working	[2
	if ar e.g. awa	thick(o ignor A with ignor	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con	–21 000 f a unit (e ied, walls ied ipression	divided by <i>.g. μm) is in</i> prevent, co / negative	50 <i>ncluded</i> bllapse ; pressure		ect working	[2
	if ar e.g. awa	thick(<i>ignor</i> <i>ignor</i> lignifie cellulo	bar) 19 000 c one mark i ened) / lignif strenghter stands, con bursting d (wall), pre se, wall / lir	–21 000 f a unit (e ied, walls ed pression events lea ing, allow	divided by <i>.g. μm) is in</i> prevent, co / negative kage / prov /s adhesion	50 ncluded ollapse ; pressure vides waterp	proofing ;	U	[2
	if ar e.g. awa 1	thick(<i>ignor</i> A with ignor lignifie cellulo A hyd	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lir rogen bondi)–21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro	divided by <i>.g. μm) is in</i> prevent, co / negative kage / prov /s adhesion ophilic	50 ncluded ollapse ; pressure vides waterp o of water (n	proofing ; nolecules)	;	
	if ar e.g. awa 1 2 3 4	thick(<i>ignor</i> A with ignor Ilignifie cellulo A hyd (relati	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d)–21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter /	divided by <i>.g. μm) is in</i> prevent, co / negative kage / prov s adhesion ophilic large cross	50 ncluded ollapse ; pressure rides waterp of water (n s-sectional a	proofing ; nolecules)	U	
	if ar e.g. awa 1 2 3 4 5	thick (ignor A with ignor lignifie cellulo A hyd (relati hollow	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d f / empty / n)–21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents	divided by s .g. µm) is in prevent, co / negative kage / prov s adhesion philic large cross s / no cytop	50 ncluded ollapse ; pressure rides waterp of water (n s-sectional a lasm ;	proofing ; nolecules)	;	
	if ar e.g. awa 1 2 3 4 5 6	thick(e ignor A with ignifie cellulo A hyd (relati hollow no en	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / cor)–21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents	divided by s .g. µm) is in prevent, co / negative kage / prov s adhesion philic large cross s / no cytop	50 ncluded ollapse ; pressure rides waterp of water (n s-sectional a lasm ;	proofing ; nolecules)	;	
	if ar e.g. awa 1 2 3 4 5	thick(<i>ignor</i> A with <i>ignor</i> A with <i>ignor</i> <i>ignifie</i> cellulo A hyd (relati hollow no en elonga	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / con ated ;	p-21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents tinuous 't	divided by s .g. µm) is in prevent, co / negative kage / prov /s adhesion philic large cross s / no cytop ubes' / AW	50 ncluded ollapse ; pressure vides waterp of water (n s-sectional a lasm ; ;	proofing ; nolecules) area / wide	; e / large lumen	
	if ar e.g. awa 1 2 3 4 5 6	thick(<i>ignor</i> A with <i>ignor</i> A with <i>ignor</i> lignifie cellulo A hyd (relati hollow no en elong A <i>if re</i>	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / con ated ; ferenced to	p-21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents tinuous 't <i>cells or ve</i>	divided by <i>.g. μm) is in</i> prevent, co / negative kage / prov s adhesion ophilic large cross s / no cytop ubes' / AW essels A ce	50 Included Included Included Includes Includes Includes Includes Includes Includes Includes Includes Includes Included Includes	proofing ; nolecules) area / wide nd (to ma	; e / large lumen ke tubes)	
	if ar e.g. awa 1 2 3 4 5 6	thick(<i>ignor</i> A with <i>ignor</i> A with <i>ignor</i> I gnifie cellulo A hyd (relati hollow no en elong A <i>if</i> re only a	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / con ated ; ferenced to llow mps 4-)-21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents tinuous 't cells or vo 7 in terms	divided by s .g. µm) is in prevent, co / negative kage / prov /s adhesion ophilic large cross s / no cytop ubes' / AW essels A ce s of ease / o	50 ncluded ollapse ; pressure rides waterp of water (n s-sectional a plasm ; ; ells end to e efficiency of	proofing ; nolecules) area / wide nd (to mai	; e / large lumen ke tubes) ovement	;
	if ar e.g. awa 1 2 3 4 5 6	thick (<i>ignor</i> <i>ignor</i> <i>ignific</i> <i>cellulo</i> <i>A</i> with <i>ignor</i> <i>ignific</i> <i>cellulo</i> <i>A</i> hyd (relati <i>hollow</i> <i>no en</i> <i>elong</i> <i>A if re</i> <i>only a</i> <i>mp 4</i>	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / con ated ; ferenced to llow mps 4- e.g. more sp)-21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents tinuous 't cells or vo 7 in terms bace allow	divided by s .g. µm) is in prevent, co / negative kage / prov s adhesion philic large cross s / no cytop ubes' / AW essels A ce s of ease / o vs a greater	50 ncluded ollapse ; pressure rides waterp of water (n s-sectional a lasm ; ; ells end to e efficiency of r volume to	proofing ; nolecules) area / wide nd (to mal f water mo flow / grea	; e / large lumen ke tubes) ovement ater volume pe	; r unit time
	if ar e.g. awa 1 2 3 4 5 6	thick(<i>ignor</i> A with <i>ignor</i> A with <i>ignor</i> lignifie cellulo A hyd (relati hollow no en elonga A <i>if re</i> <i>only a</i> <i>mp 4</i> <i>or mp</i>	bar) 19 000 c one mark i ened) / lignif e strenghter stands, con e bursting d (wall), pre se, wall / lin rogen bondi vely) large d c / empty / n d walls / con ated ; ferenced to llow mps 4- e.g. more sp	–21 000 f a unit (e ied, walls bed pression events lea ing, allow ng / hydro iameter / o contents tinuous 't cells or vo 7 in terms bace allow nimal resi	divided by s .g. µm) is in prevent, co / negative kage / prov /s adhesion ophilic large cross s / no cytop ubes' / AW essels A ce s of ease / of /s a greaten fstance to fl	50 ncluded ollapse ; pressure vides waterp of water (n s-sectional a lasm ; ; ells end to e efficiency of volume to ow, allows of	proofing ; nolecules) area / wide nd (to mal f water mo flow / grea	; e / large lumen ke tubes) ovement	; r 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; 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 ; 						
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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]