Location Entry Codes

www.papaCambridge.com 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.

UNIVERSI

International

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.

Mark Scheme **Question Paper** 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

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Advanced Subsidiary Level and GCE Advanced Level

www.papacambridge.com MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

9700 BIOLOGY

9700/21

Paper 21 (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 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.

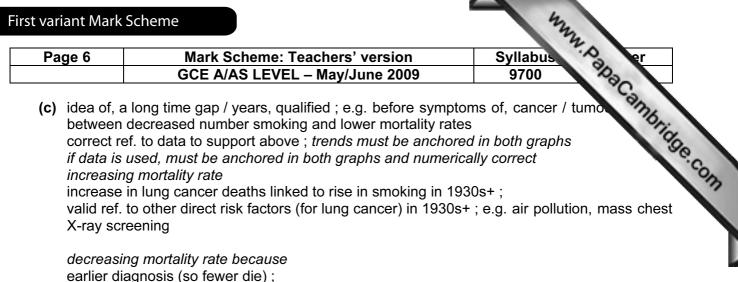
CIE is publishing the mark schemes for the May/June 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2		2					rs' versioi		Syllabu	S. S	er
				GCE A	AS LEV	EL – May	/June 200	9	9700	X	So l
(a)	(i)	pore (<i>mit</i> o	; chond	<i>ion)</i> two	membra	ines with			ace and a ached or u	t least of	a Cambrid
		if wr	ongly la	belled o	r both lal	bels omitt	ed, penalis	se once			[3]
	(ii)	(to n	earest	<u>whole</u> nu	imber) (x) 2857 ;;	A 2829 –	2886			
		leng	h of sc	ale bar ir	1 mm × 1	1000, divi	answer inco ded by act 9–101 mm)	ual size	to whole n	umber / n	o answer [2]
(b)	cyto ribo	oplasi osome	n / cyto s / 708	sol ;	nes / 18n		R membr mes;R 80		/ larger, rib	osomes	[3 max]
(c)	À re	elease	es muc	us R talk	s				oreathes <u>ou</u> ed person)	_	s ; [2]
	À re <u>aer</u>	elease	es muc drople	us R talk	s					_	
	À re <u>aer</u>	elease <u>osol</u> / <u>0.25</u>	es muc <u>drople</u> ;	ús R talk <u>s</u> / <u>moist</u>	s air, inha		athed in (b			_	[2]
	À re <u>aer</u> (i)	elease <u>osol</u> / <u>0.25</u> <u>sugg</u> poor low (not, DOT lack antik med idea MDF resis no e no fa lack	es muc drople ; ested i / dens orotein diagno S / des of vacc acteria cal ser of TB, cal ser of TB, cal ser of TB, cal ser of TB, cal ser of tance ; fective of, test	is R talk <u>s</u> / <u>moist</u> e asons t e / overc diets link sed / trea cribed, r ination / l drugs / vices not linked to / XDR - antibioti for isolat ng / trea	s air, inha for high f rowded, ed to lov ated, earl ot used vaccinat antibiotid t availab HIV/AID – TB / r cs to use ting peop tment of	aled / brea fatality rat housing / vered imr ly enough ; ions ineff cs / AW, i le, qualifie cs / AW, i le, qualifie cs / oppor not compl e; ole ; , cattle / r	athed in (b ios accommo nunity ; a; ective ; not availab ed e.g. in r tunistic dis eting the nilk ; A unp	y uninfecte dation ; le / too exp ural areas ease ; course of	ed person) pensive ; / AW ; antibiotic t	;	[2]
	À re <u>aer</u> (i)	elease osol / 0.25 sugg poor low not, DOT lack antik med idea MDF resis no e no fa lack diffic	es muc drople ; ested / dens orotein diagno S / des of vacc acteria cal ser of TB, C – TB tance ; fective icilities of, test ulty in	is R talk <u>s</u> / <u>moist</u> easons is e / overc diets link sed / trea cribed, r ination / I drugs / vices not inked to / XDR - antibioti for isolat ng / trea obtaining	s air, inha for high f rowded, aed to low ated, earl ot used vaccinat antibiotic t availabl HIV/AID – TB / r cs to use ting peop tment of reliable	aled / brea fatality rat housing / vered imr ly enough ; ions ineff cs / AW, n le, qualifie (S / oppor not compl e; ole ; , cattle / r data / AV	athed in (b ios accommo nunity ; a; ective ; not availab ed e.g. in r tunistic dis eting the nilk ; A unp	y uninfecte dation ; le / too exp ural areas ease ; course of	ed person) pensive ; / AW ; antibiotic t	;	[2]

	nge 3	8	Ма	ark Schem	e: Teacher	s' version	S	llabus	er
			GC	E A/AS LE	VEL – May	/June 2009		9700	Share .
(a)	<u>all</u> 1 are nicl	bitat ; the org a / hal he ; bulatio	oitat ;	ants and ar	nimals / pop	oulations / A	W, in the eco	system / for	oapacambrid est
(b)	(i)	prima	ary consum	er / herbivo	re ;				[1]
	(ii)					all (in leaves			
		able	to, absorb /		icts / sugars	to digest ce s, from, cellu		II, digestion	;
			•	itrogen, rec					
		idea	of protectio	n from gut,	pathogens	/ parasites ;			[1 max]
		energ detai eges (prey pred	gy loss, bet l e.g. only 1 tion / to dec numbers s ators hunted	ween trophi 10% transfe composers;	ic levels / a er / respirat <u>mpetition</u> fo is ;	long food ch ion / heat / r or, food / pre	ain / inefficie novement / e	rey / sloths / nt energy tra excretion / in	
		Πάριι	als / aleas,	or predator	s destroye	Ј ,			[5 max]
									[Total: 9]
(a)	larg sur (SA 3.0 boo no ref. A d	face a (V rat) / 12.0 dy surf cell is <u>diffus</u> lescrip	gh, surface rea (on its c o) 5.95:1 ; ace is gas c far from sur ion of, oxyg tion of diffu	own) A anything exchange s face / short len / carbor sion as mor	urface ; urface ; t (diffusion) dioxide / g vement fror	:1 and 7:1 o distance ; ases ; A ga		lculation e.g by <u>diffusion</u>	atio; R large . 2 × (12.5 ×
(a)	larg sur (SA 3.0 boo no ref. A d	ge / hig face a A:V rat) / 12.) / 12. Jy surf cell is <u>diffus</u> lescrip	gh, surface rea (on its c o) 5.95:1 ; ace is gas c far from sur ion of, oxyg tion of diffu	own) A anything exchange s face / short len / carbor	urface ; urface ; t (diffusion) dioxide / g vement fror	:1 and 7:1 o distance ; ases ; A ga	r suitable ca s exchange l	lculation e.g by <u>diffusion</u>	atio; R large
	larg sur (SA 3.0 boo no ref. A d	ge / hig face a A:V rat () / 12.0 dy surf cell is diffus lescrip (activ cell r (as) activ move	gh, surface rea (on its c o) 5.95:1 ; ace is gas e far from sur ion of, oxyg tion of diffu ity / metabo nembranes sodium ion e transport	own) A anything exchange s face / short len / carbor sion as mo olic rate / me impermeat channels au / active upta ns against t	between 5 urface ; t (diffusion) dioxide / g vement fror etabolism ; ole to sodiu re not prese ake ; A soo	:1 and 7:1 o distance ; jases ; A ga n high to low m ions ; ent (in cell m	r suitable ca s exchange l concentration embranes) ; to take up so	lculation e.g by <u>diffusion</u> on	atio; R large . 2 × (12.5 ×
	larg sur (SA 3.0 boo no ref. A d low	ge / hig face a (12.1 dy surf cell is <u>diffus</u> lescrip (activ activ move uses	gh, surface rea (on its c o) 5.95:1 ; ace is gas e far from sur ion of, oxyg tion of diffu ity / metabo nembranes sodium ion e transport , sodium ion e energy / A	own) A anything exchange s face / short len / carbor sion as mo olic rate / me impermeat channels au / active upta ns against t	urface ; t (diffusion) dioxide / g vement fror etabolism ; ole to sodiu re not prese ake ; A soc heir concer	:1 and 7:1 o distance ; ases ; A ga m high to low m ions ; ent (in cell m dium pumps	r suitable ca s exchange l concentration embranes) ; to take up so	lculation e.g by <u>diffusion</u> on	atio; R large . 2 × (12.5 ×
	larg sur (SA 3.0 boo no ref. A d low	ge / hig face a (1) / 12.0 dy surf cell is diffus lescrip (as) (1) activ move uses R ref	gh, surface rea (on its c o) 5.95:1 ; ace is gas e far from sur ion of, oxyg tion of diffu ity / metabo nembranes sodium ion e transport sodium ion e nergy / A s to cell wa	own) A anything exchange s face / short len / carbor sion as mo- blic rate / me impermeat channels ar / active upta ns against t TP ; lls / imperme	urface ; t (diffusion) n dioxide / g vement fror etabolism ; ole to sodiu re not prese ake ; A soo heir concer	and 7:1 o distance ; ases ; A ga m high to low m ions ; ent (in cell m dium pumps ntration grad	r suitable ca s exchange l concentration embranes) ; to take up so ent ;	lculation e.g by <u>diffusion</u> on	atio ; R large . 2 × (12.5 × [4 max]
	larg sur (SA 3.0 boc no ref. A d low	ge / hig face a (:V rat) / 12.1 dy surf cell is <u>diffus</u> lescrip (, activ move uses R ref to ele helps helps	gh, surface rea (on its c o) 5.95:1 ; ace is gas e far from sur ion of, oxyg tion of diffu ity / metabo e transport , e sodium ion e transport , s to cell wa o, (nerve) in ctric as new to maintain to maintain	A anything A anything exchange s face / short len / carbor sion as mo- olic rate / me impermeat channels ar / active upta ns against t TP ; Ils / imperme npulses / ac utral n, water / so n, osmotic /	between 5 urface ; t (diffusion) dioxide / g vement fror etabolism ; ble to sodiu re not prese ake ; A so heir concer heable skin ction potent olute / osmo	it and 7:1 o distance ; lases ; A ga n high to low m ions ; ent (in cell m dium pumps ntration grad dials / depola ptic, <u>potentia</u> , balance ;	r suitable ca s exchange l concentratio embranes) ; to take up so ent ; risation / rest	lculation e.g by <u>diffusion</u> on	atio ; R large . 2 × (12.5 × [4 max] ; <i>treat ref</i> .
	larg sur (SA 3.0 boc no ref. A d low	ge / hig face a (i) / rat (i) / 12.0 (i) / 1	gh, surface rea (on its c o) 5.95:1 ; ace is gas e far from sur ion of, oxyg tion of diffu ity / metabo nembranes sodium ion e transport sodium ion e nergy / A s to cell wa o, (nerve) in ectric as new to maintain o, urine form	A anything A anything exchange s face / short len / carbor sion as mor olic rate / me impermeat channels ar / active upt as against t TP ; Ils / imperme npulses / ac <i>utral</i> n, water / so	urface ; t (diffusion) n dioxide / g vement fror etabolism ; ole to sodiu re not prese ake ; A soc heir concer neable skin ction potent olute / osmo ' electrolyte noregulatio	it and 7:1 o distance ; lases ; A ga n high to low m ions ; ent (in cell m dium pumps ntration grad dials / depola ptic, <u>potentia</u> , balance ;	r suitable ca s exchange l concentratio embranes) ; to take up so ent ; risation / rest	lculation e.g by <u>diffusion</u> on odium ions	atio ; R large . 2 × (12.5 × [4 max ; treat ref

Page 4				Mark Scheme: Teachers' version Syll	abus 😪 er
				GCE A/AS LEVEL – May/June 2009 97	700 23
((a)	(i)	B C	transcription ; tRNA / transfer RNA ; ribosome ; A subunit of ribosome / ribosomal subunit <i>treat 70S / 80S or small / large as neutral</i> anticodon ;	abus 700 apacambrida [4]
		(ii)	simi	ilarities	
			poly have four	de of amino acids / amino acid monomers / polymer of a /peptides e quaternary structure / have more than one polypeptide chair ;, sub-units / polypeptides ;	ı;
				m / porphyrin / prosthetic group(s) ;	[2 max]
				erence	
			or	r) sub-units / polypeptides, are identical ;	
			hae <i>or</i>	moglobin has, two different, sub-units / polypeptides ;	
			hae	moglobin has alpha and beta polypeptides ;	
			(cat	alase) has active site(s); A Hb has (oxygen) binding site	[1 max]
	(iii)		h, sub-unit / polypeptide, has an active site ; alase has four, active sites / haem groups ;	[1 max]
((b)		ne in dine	n potassium iodide solution / iodine in KI solution / I in KI solu	tion ; A iodine solution
				t's, solution / reagent ; A Benedict's ng's solution / NaOH and CuSO ₄	[2]
		trea	t refs	s to colour changes as neutral	
					[Total: 10]
((a)	wat apo sym eva fron into diffu	er po plast plas pora n <u>spo</u> (sub usion	oves <u>down</u> water potential gradient ; A high(er) to low(er) otential / less negative to more negative water potential t pathway / through cell walls ; ot pathway / through, plasmodesmata / cytoplasm ; tion ; ongy mesophyll cell walls ; ostomatal / intercellular) air space ; n of water vapour ; A diffusion of water if evaporation u	sed in correct context
		else	whe		

P	_		
	age 5	Mark Scheme: Teachers' versior GCE A/AS LEVEL – May/June 200	n Syllabus er 09 9700
(b	any thre eith cellulos allows a or <u>thick</u> (c	ation must correctly relate to structure before r ree from the following six pairs ther se, cell wall / lining ; adhesion of water ; cellulose) cell wall ; ts collapse / idea of providing support (under	3
	lignin ; waterpr or lignin ; prevent	roofing / prevents water loss ; A rings / spirals / thickening / AW (of walls) ts collapse / idea of providing support (under	
	less re	oplasm / lack of contents / hollow / empty lume esistance to / unimpeded / uninterrupted / unhi ter volume per unit time / faster rate R continu	indered / ease of / AW, flow / AW ;
	less re	end walls / continuous tube ; esistance to / unimpeded / uninterrupted / unhi inuous, smooth	indered / ease of / AW, flow / AW ;
		ores ; R holes movement / movement around air bubbles / ;	supplies (water) to (surrounding), cells
		arge diameter / large lumen ; e volume of water can be transported ;	[6 ma
	30 large		[Total: 10
(a	A in, ce nuclear	osomes / chromatids, on equatorial plate / at e entre / middle, of cell r, membrane / envelope, dispersing / breaking opearing	
	chromo separat	bsomes, in one group / not in two groups / no ted / AW ; mosomes at poles	ot arrow shaped / not going to poles / not going
(b	phenol genes o mutatio gene e suppres	control, cell division / mitosis ; on / change to DNA (in these genes) ; A DNA expression affected / AW ; e.g. ref to onc ssor genes switched off	A damaged A ref. to mutagenic cogenes / proto – to onco – / tumo
	cancer	row / divide, uncontrollably / continuously ; A cells do not respond to signals ; orm a (malignant) <u>tumour</u> ;	



improved, health care / treatment (extends life);

ref. to epidemiological evidence linking smoking and lung cancer / almost all cases of lung cancer, are caused by smoking / occur in smokers ; [3 max]

[Total: 9]

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Advanced Subsidiary Level and GCE Advanced Level

www.papacambridge.com MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

9700 BIOLOGY

9700/22

Paper 22 (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 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.

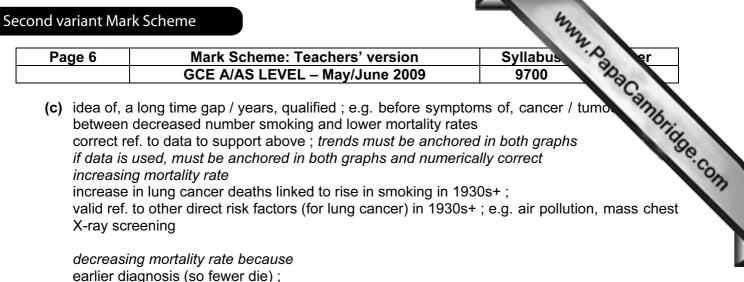
CIE is publishing the mark schemes for the May/June 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

 (ii) (to nearest <u>whole</u> micrometre) 5(μm);; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000μm A +/- 1mm on length of bar 8000 8000 [2] (b) capsule / slime layer; cell wall; flagellun (of flagellin); DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid; DNA, naked / without histones; only, smaller / 70S / 18nm, ribosomes; A only one type of ribosome mesosome; [3 max] (c) 0.47; [1] (d) provide, boiled water / bottled water / sterile water; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT; A ORS (contains) glucose and, salts / electrolytes; absorption of salts helps to absorb glucose; (absorption of salts helps to absorb glucose; safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants (f) transmission cycle is broken; sewage treatment plants; A drinking water is planet (in the right of a sing sterile (in the right of a supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; [2 max] 	Pa	ge 2				eme: Teache			Syllabus	· A er
 vesicle shown fused to cell surface membrane ; R if add arrows pointing towards cell contents [3] (ii) (to nearest <u>whole</u> micrometre) 5(μm) ;; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 8000 8000 8000 [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>diucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>diucose</u> ; (absorption of salts helps to absorb <u>diucose</u> ; absorption of salts helps to flave uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 					GCE A/AS	LEVEL – Ma	y/June 200	9	9700	10gg
 vesicle shown fused to cell surface membrane ; R if add arrows pointing towards cell contents [3] (ii) (to nearest <u>whole</u> micrometre) 5(μm) ;; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 8000 8000 8000 [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>diucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>diucose</u> ; (absorption of salts helps to absorb <u>diucose</u> ; absorption of salts helps to flave uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 	(a)	(i)	Golg	i body						amp.
 vesicle shown fused to cell surface membrane ; R if add arrows pointing towards cell contents [3] (ii) (to nearest <u>whole</u> micrometre) 5(μm) ;; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 8000 8000 8000 [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>diucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>diucose</u> ; (absorption of salts helps to absorb <u>diucose</u> ; absorption of salts helps to flave uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 							• •			10
 vesicle shown fused to cell surface membrane ; R if add arrows pointing towards cell contents [3] (ii) (to nearest <u>whole</u> micrometre) 5(μm) ;; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 8000 8000 8000 [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>diucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>diucose</u> ; (absorption of salts helps to absorb <u>diucose</u> ; absorption of salts helps to flave uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 			Secre	etory vea	SICIES IUTTI	ng at the side	of the Goig	ji ;		
contents [3] (ii) (to nearest whole micrometre) 5(μm);; allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000um A+/- 1mm on length of bar 8000 8000 e.g. 4 cm 40 mm 40000um A0000um A+/- 1mm on length of bar 8000 8000 [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellin); DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; ONA, maked / without histones ; only one type of ribosome mesosome ; (c) 0.47; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) glucose and, salts / electrolytes ; absorption of salts increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotis (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]			exoc	ytosis						
allow one mark for correct working if answer is incorrect / not to whole number / no answer length of bar / 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 8000 e.g. 4 cm 40 mm 40000µm A +/- 1mm on length of bar 8000 (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; only, smaller / 70S / 18mn, ribosomes ; A only one type of ribosome mesosome ; (c) 0.47 ; (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) glucose and, salts / electrolytes ; absorption of salts helps to absorb glucose; ; (absorption of salts helps to absorb glucose; ; (absorption of salts helps to absorb glucose; ; (basorption of salts helps to absorb glucose; ; (absorption of salts helps to absorb glucose; ; (absorption of salts helps to absorb glucose; ; (basorption of salts helps to absorb glucose; ; (absorption of salts helps to absorb glucose; ; (basorption of salts helps to absorb glucose; ; (c) transmission cycle is broken ; safe sewage disposal, qualified ; R sewage treat					n fused to	cell surface	membrane	; R if add	d arrows poin	ting towards cell [3]
answer length of bar / 8000 e.g. 4 cm 40 mm 8000 8000 8000 8000 8000 8000 8000 8000 (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) glucose and, salts / electrolytes ; absorption of salts helps to absorb glucose; (absorption of salts helps to absorb glucose; (absorption of salts) helps to absorb glucose; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]		(ii)	(to ne	earest <u>w</u>	<u>hole</u> micro	metre) 5(μm));;			
 e.g. <u>4 cm</u> <u>40 mm</u> <u>40000µm</u> A +/- 1mm on length of bar [2] (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; (c) <u>0.47</u> ; (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>glucose</u> ; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; 					ark for cor	rect working	if answer i	s incorrec	ct / not to wh	ole number / no
 (b) capsule / slime layer ; cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; (c) 0.47 ; (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts helps to absorb <u>glucose</u>; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; 			-				/ 4			
 cell wall ; R cellulose / chitin, cell wall flagellum (of flagellin) ; DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid ; DNA, naked / without histones ; only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>glucose</u> ; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 			e.g.				_ A +/- 1	mm on ler	ngth of bar	[2]
 flagellum (of flagellin); DNA free in cytoplasm / loop of DNA / circular DNA / nucleoid / plasmid; DNA, naked / without histones; only, smaller / 70S / 18nm, ribosomes; A only one type of ribosome mesosome; (c) 0.47; (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT; A ORS (contains) <u>glucose and</u>, salts / electrolytes; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration; idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants (f) transmission cycle is broken; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; 	(b)				•	n. cell wall				
only, smaller / 70S / 18nm, ribosomes ; A only one type of ribosome mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) glucose and, salts / electrolytes ; absorption of salts helps to absorb glucose ; (absorption of salts helps to absorb glucose ; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants (a trinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]		flag DN/	ellum A free	(of flage in cytop	ellin) ; plasm / loop	o of DNA / circ	cular DNA /	nucleoid /	plasmid ;	
mesosome ; [3 max] (c) 0.47 ; [1] (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and, salts / electrolytes ; absorption of salts helps to absorb glucose ; (absorption of salts helps to absorb glucose ; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] </u>							only one ty	pe of ribo	osome	
 (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 		-					-			[3 max]
 (d) provide, boiled water / bottled water / sterile water ; A valid description of method to, remove / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT ; A ORS (contains) <u>glucose and</u>, salts / electrolytes ; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW ; deaths usually caused by (rapid) dehydration ; idea of rapid provision (of, ORT / medical supplies / personnel) ; provide antibiotics (for severe cases) ; safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 	(c)	0.47	7 <u>:</u>							[1]
 / kill, bacteria provide, oral / intravenous, rehydration therapy / ORT; A ORS (contains) <u>glucose and</u>, salts / electrolytes; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration; idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants / mains drainage; human faeces do not come into contact with drinking water supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; 	1.57	<u>•</u> :	_ ,							
 provide, oral / intravenous, rehydration therapy / ORT; A ORS (contains) <u>glucose and</u>, salts / electrolytes; absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration; idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants / mains drainage; human faeces do not come into contact with drinking water supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; 	(d)	•			ater / bottle	d water / ster	ile water ; A	valid des	cription of me	ethod to, remove
 absorption of salts helps to absorb <u>glucose</u>; (absorption of salts) increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration; idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants / mains drainage; human faeces do not come into contact with drinking water supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; 		prov	vide, c	oral / inti		•		r; A OR	S	
 (absorption of salts) increases water uptake, by osmosis / AW; deaths usually caused by (rapid) dehydration; idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants (e) transmission cycle is broken; sewage treatment plants / mains drainage; human faeces do not come into contact with drinking water supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; 										
 idea of rapid provision (of, ORT / medical supplies / personnel); provide antibiotics (for severe cases); safe sewage disposal, qualified ; R sewage treatment plants (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; 		(abs	sorptio	on of sal	lts) increase	es water upta	ke, by osmo	osis / AW ,	;	
 provide antibiotics (for severe cases); safe sewage disposal, qualified; R sewage treatment plants [4 max] (e) transmission cycle is broken; sewage treatment plants / mains drainage; human faeces do not come into contact with drinking water supply; water treatment plants; A drinking water is, chlorinated / treated, to kill bacteria; drinking water is piped to homes; [2 max] 				-						
 safe sewage disposal, qualified ; R sewage treatment plants [4 max] (e) transmission cycle is broken ; sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max] 					•		suppiles / p	ersumen)	,	
sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]					•	, ·	ge treatmen	t plants		[4 max]
sewage treatment plants / mains drainage ; human faeces do not come into contact with drinking water supply ; water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]	(e)	tran	smiss	ion cvc	⊨ is broken	· ·				
water treatment plants ; A drinking water is, chlorinated / treated, to kill bacteria ; drinking water is piped to homes ; [2 max]	(~)	sew	vage ti	reatmen	it plants / m	nains drainage				
drinking water is piped to homes ; [2 max]							-			vria ·
				•		•	5, 0110111120			
										[Total: 15]

	age 3	3 Mark Scheme: Teachers' version Sylla	bus of er
	U	GCE A/AS LEVEL – May/June 2009 970	00 100
(a)	<u>all</u> t are nicl	bitat ; the organisms / plants and animals / populations / AW, in the ecosys ea / habitat ; che ; pulation ;	bus 00 Pathocannhi tem / forest
(b)	(i)	primary consumer / herbivore ;	[1]
	(ii)	(sloth) cannot digest, cellulose / cell wall (in leaves), itself;	
	(,	R cannot digest leaves R allows sloth to digest cellulose	
		able to, absorb / use, products / sugars, from, cellulose / cell wall, c	ligestion ;
		provide, vitamins / minerals ;	
		ref to, protein / nitrogen, recycling ; idea of protection from aut, pathagana / parasitas ;	[1 mov]
		idea of protection from gut, pathogens / parasites ;	[1 max]
		 (population, size / number of) predators limited by numbers of prey energy loss, between trophic levels / along food chain / inefficient e detail e.g. only 10% transfer / respiration / heat / movement / excr egestion / to decomposers ; (prey numbers small so) <u>competition</u> for, food / prey ; predators hunted by humans ; 	nergy transfer ;
		habitats / areas, of predators destroyed ;	[3 max]
(0)	thin	- / 51_4 .	[Total: 9]
(a)	larg sur (SA 3.0 boc no ref. A d	n / flat ; ge / high, surface area to volume ratio / small / low, volume to surface rface area (on its own) A:V ratio) 5.95:1 ; A anything between 5:1 and 7:1 or suitable calcul 0) / 12.6 dy surface is gas exchange surface ; cell is far from surface / short (diffusion) distance ; <u>cell is far from surface / short (diffusion) distance ;</u> <u>description of diffusion as movement from high to low concentration</u> v, activity / metabolic rate / metabolism ;	e area ratio ; R large ation e.g. 2 × (12.5 ×
	larg sur (SA 3.0 boc no ref. A d low	ge / high, surface area to volume ratio / small / low, volume to surface rface area (on its own) A:V ratio) 5.95:1 ; A anything between 5:1 and 7:1 or suitable calcul 0) / 12.6 dy surface is gas exchange surface ; cell is far from surface / short (diffusion) distance ; <u>cell is far from surface / short (diffusion) distance ;</u> <u>diffusion</u> of, oxygen / carbon dioxide / gases ; A gas exchange by <u>c</u> description of diffusion as movement from high to low concentration	e area ratio ; R large ation e.g. 2 × (12.5 × <u>liffusion</u> [4 max]
	larg sur (SA 3.0 boc no ref. A d low	ge / high, surface area to volume ratio / small / low, volume to surface rface area (on its own) A:V ratio) 5.95:1 ; A anything between 5:1 and 7:1 or suitable calcul 0) / 12.6 dy surface is gas exchange surface ; cell is far from surface / short (diffusion) distance ; <u>cell is far from surface / short (diffusion) distance ;</u> <u>description of diffusion as movement from high to low concentration v</u> , activity / metabolic rate / metabolism ; cell membranes impermeable to sodium ions ; (as) sodium ion channels are not present (in cell membranes) ; active transport / active uptake ; A sodium pumps to take up sodiu move sodium ions against their concentration gradient ; uses, energy / ATP ; R refs to cell walls / impermeable skin	e area ratio ; R large ation e.g. 2 × (12.5 × liffusion [4 max] m ions [2 max]
	larg sur (SA 3.0 boc no ref. A d low	ge / high, surface area to volume ratio / small / low, volume to surface rface area (on its own) A:V ratio) 5.95:1 ; A anything between 5:1 and 7:1 or suitable calcul 0) / 12.6 dy surface is gas exchange surface ; cell is far from surface / short (diffusion) distance ; : <u>diffusion</u> of, oxygen / carbon dioxide / gases ; A gas exchange by <u>o</u> description of diffusion as movement from high to low concentration v, activity / metabolic rate / metabolism ; cell membranes impermeable to sodium ions ; (as) sodium ion channels are not present (in cell membranes) ; active transport / active uptake ; A sodium pumps to take up sodiu move sodium ions against their concentration gradient ; uses, energy / ATP ; R refs to cell walls / impermeable skin ref. to, (nerve) impulses / action potentials / depolarisation / resting <i>to electric as neutral</i> helps to maintain, water / solute / osmotic, <u>potential</u> of, body fluids helps to maintain, osmotic / electrolyte, balance ;	e area ratio ; R large ation e.g. 2 × (12.5 × liffusion [4 max] m ions [2 max] potential ; <i>treat ref.</i>
	larg sur (SA 3.0 boc no ref. A d low	ge / high, surface area to volume ratio / small / low, volume to surface rface area (on its own) A:V ratio) 5.95:1 ; A anything between 5:1 and 7:1 or suitable calcul 0) / 12.6 dy surface is gas exchange surface ; cell is far from surface / short (diffusion) distance ; : <u>diffusion</u> of, oxygen / carbon dioxide / gases ; A gas exchange by <u>o</u> description of diffusion as movement from high to low concentration v, activity / metabolic rate / metabolism ; cell membranes impermeable to sodium ions ; (as) sodium ion channels are not present (in cell membranes) ; active transport / active uptake ; A sodium pumps to take up sodiu move sodium ions against their concentration gradient ; uses, energy / ATP ; R refs to cell walls / impermeable skin ref. to, (nerve) impulses / action potentials / depolarisation / resting <i>to electric as neutral</i> helps to maintain, water / solute / osmotic, <u>potential</u> of, body fluids	e area ratio ; R large ation e.g. 2 × (12.5 × liffusion [4 max] m ions [2 max] potential ; <i>treat ref.</i>

Page 4	Mark Scheme: Teachers' version Syllabus er
	GCE A/AS LEVEL – May/June 2009 9700
(a) (i)	Mark Scheme Teachers' version Syllabus GCE A/AS LEVEL – May/June 2009 9700 A transcription ; 3tRNA / transfer RNA ; ribosome ; A subunit of ribosome / ribosomal subunit treat 70S / 80S or small / large as neutral 4transcription ; anticodon ; 4transcription ;
(ii)	similarities
	nade of amino acids / amino acid monomers / polymer of amino acids A protein / polypeptides nave quaternary structure / have more than one polypeptide chain ; our, sub-units / polypeptides ;
	naem / porphyrin / prosthetic group(s) ; [2 max]
	lifference
	four) sub-units / polypeptides, are identical ;
	or naemoglobin has, two different, sub-units / polypeptides ;
	or naemoglobin has alpha and beta polypeptides ;
	catalase) has active site(s); A Hb has (oxygen) binding site [1 max]
(iii)	each, sub-unit / polypeptide, has an active site ; catalase has four, active sites / haem groups ; [1 max]
(b) iodi Rio	e in potassium iodide solution / iodine in KI solution / I in KI solution ; ${f A}$ iodine solution ine
	dict's, solution / reagent ; A Benedict's hling's solution / NaOH and CuSO₄ [2]
trea	refs to colour changes as neutral
	[Total: 10]
	one endodermal cell ;
(a) P to	
	the cell <u>wall</u> of one of the four xylem vessels ;

Ра	ige 5	Mark Scheme: Teachers' version	Syllabus er
	<u> </u>	GCE A/AS LEVEL – May/June 2009	9700 22
(b)	blocks, a ref. to pa water / (ii pathway cell can s ref. to, ac	an strip / suberin, is impermeable (to water) ; apoplast pathway / pathway between cells / cell wall p assage cells ; inorganic) solutes / minerals / ions, must pass through / / symplast pathway described ; select solutes / AW ; ictive transport / carrier proteins ; resence of solutes (at base of xylem) causing increase	h, endodermal cells / symple
(c)	explanat	tion must correctly relate to structure before marks ca	n be awarded
	any two :	from the following six pairs	
	<u>sieve</u> por allow eas	ores ; isy flow (from sieve tube element to sieve tube elemer	nt); R flow of water
	sieve pla (may) pre	ate ; revent sieve tubes from bursting / AW ;	
	•	face) membrane / plasma membrane ; s loss, of sucrose / assimilates / phloem sap ;	
		contents / AW; R no cell contents istance / AW, to flow; R flow of water	
		lesmata ; ow, to / from, companion cells ;	
	thin walls for, rapid	s ; d / easy, entry of water (at source, to build up pressure	re); [4]
			[Total: 10]
(a)	A in, cen	somes / chromatids, on equatorial plate / at equator / A ntre / middle, of cell	
	A disapp		
	separate		
	R chrom	nosomes at poles	[2 max]
(b)	phenol	tar, is carcinogenic / contains carcinogens ; A named	l carcinogen e.g. benzpyrene /
	mutation gene exp genes sw	ontrol, cell division / mitosis ; n / change to DNA (in these genes) ; A DNA damage pression affected / AW ; e.g. ref to oncogenes / pro- witched off	oto to onco / tumour suppressor
	cancer ce	ow / divide, uncontrollably / continuously ; A uncontro cells do not respond to signals ;	olled mitosis
	· /	rm a (malignant) <u>tumour</u> ; tles on bronchial, epithelial cells / epithelium ;	[4 max



improved, health care / treatment (extends life);

ref. to epidemiological evidence linking smoking and lung cancer / almost all cases of lung cancer, are caused by smoking / occur in smokers ; [3 max]

[Total: 9]