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9700 BIOLOGY

9700/23

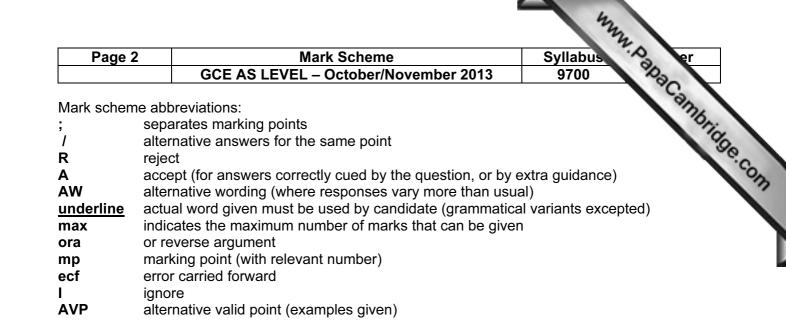
Paper 2 (AS Structured Question), maximum raw mark 60

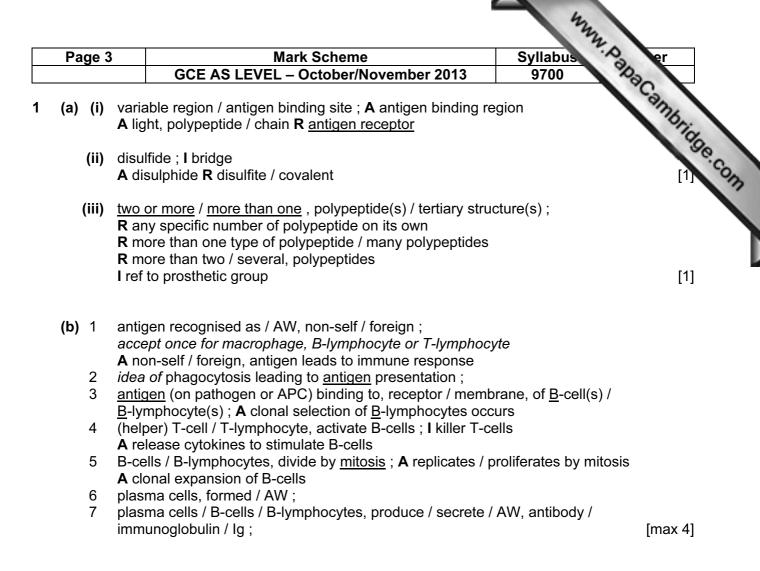
This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, 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 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.





(c) parasite / Plasmodium / pathogen / protoctist / protozoan must be mentioned at least once somewhere in the answer to gain any marks e.g. 'malaria / disease has many antigens' = 0

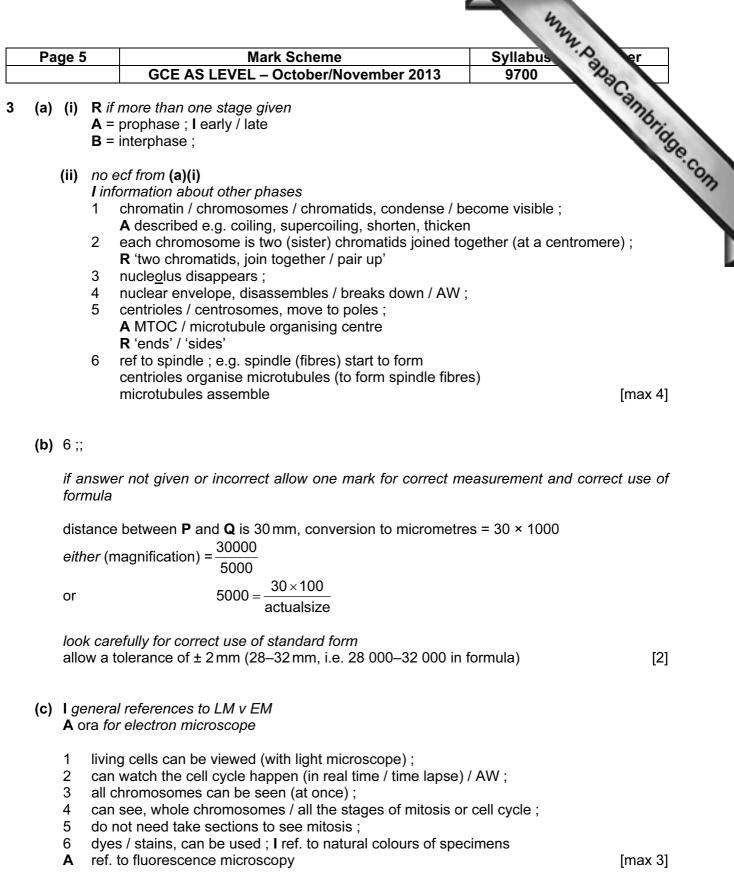
if malaria is caused by a virus / bacterium penalise once only

- (malarial) parasite / pathogen / *Plasmodium*, (is eukaryotic) has many genes;
 A has greater genetic complexity cf smallpox / AW
- 2 different (malarial) parasite, species / strains / AW, have different antigens ; R 'strands'
- 3 (malarial) parasite has different antigens in different stages of its life cycle ;
- 4 (malarial) parasite / *Plasmodium*, switches antigens / idea of antigens changing during infection / different genes coding for antigens switching on / AW;
 R 'active sites' of antigens changing
 R 'antigens mutate'
- 5 parasite / antigen / stages of the life cycle, inside (host / liver / red blood) cells; [max 2]

[Total: 9]

	4	Mark Scheme	Syllabus er
		GCE AS LEVEL – October/November 2013	9700 23
a) 1 2 3 4 5 6	A con R if n I nitro (cata <u>ATP</u> , ref. to amm plant	gen, converted / reduced / fixed, to, ammonium / ammonitum rrect equation $N_2 (+6e^- +8H^+) \rightarrow (2)NH_4^+/(2)NH_3$ nitrogen fixation is said to happen in the soil ogen fixation is carried out by leguminous plant alysed by) nitrogenase ; <i>accept if part of equation</i> , hydrolysed / AW ; <i>accept if part of equation</i> o anaerobic conditions ; nonia (converted) to amino acids to protein (in plants) ; t protein, digested / hydrolysed / broken down, by anim	oride
7		orbed) ; no acids used to synthesise (animal) protein ;	[max 5]
c) mF is t tRI	UAC ; [1] mRNA, less stable / broken down sooner / used only for a short time / does not last long / is temporary / has short (half-) life ; I 'used up' tRNA is re-used (for a longer time); no ora <i>unless correct ref. to mRNA 'shelf life'</i> [max1]		
d) 1 2 3 4 5 6	AW ; attac A ref R mF tRNA A pro bindi (cata any f	slation (<i>in correct context</i>) / genetic code used to make ch / assemble around / moves along / AW, mRNA ; f. to bind mRNA / mRNA 'lies within' the ribosome RNA enters ribosome A(s) carrying amino acid(s), bind to / AW, mRNA ; ovides two sites for tRNAs carrying amino acids to bind ing / pairing / AW, between anticodon on tRNA to codo alyse) formation of peptide bond (to form polypeptide) ; further detail of translation ; peptidyl transferase	d to mRNA n on mRNA ;

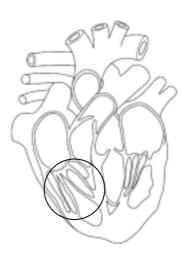
[Total: 10]



[Total: 11]

Page 6		Mark Scheme	Syllabus of er
		GCE AS LEVEL – October/November 2013	9700
•	X tricu	t atrium labelled in lumen / wall ; spid valve labelled ; A valve flap / chordae tendinae s a labelled ;	ee encircled area on dia

- (a) W right atrium labelled in lumen / wall;
 - X tricuspid valve labelled ; A valve flap / chordae tendinae see encircled area on dia
 - **Y** aorta labelled ;



(b) needs to be a sequence, not events in the cardiac cycle e.g. I valves

aorta, body (tissues / blood vessels) / capillaries / systemic circulation, vena cava ; A body cells right atrium and right ventricle; pulmonary artery (to lungs); R if blood comes from left ventricle

[3]

(c) max 2 for structural features

I fast diffusion, efficient diffusion, reduces diffusion distance mps 4, 6, 8 and 10 – can be awarded if related structure is not given but is implied

- 1 many alveoli ;
- 2 large surface area ; I high SA:V ratio / increase SA
- 3 many capillaries / network of capillaries ; I good blood supply
- 4 (so) maintain, diffusion / concentration / partial pressure, gradient(s);
- 5 lining / epithelium / wall, of, alveoli / gas exchange surface, is thin / one cell thick / squamous ; I thin interstitium
 - R 'cell walls of' R lungs R alveoli are one cell thick R endothelium / membrane
- (so) short diffusion distance / only diffuse through two cells ; 6
- 7 ref. to, elastin / elastic fibres ; I alveoli are elastic
- (so) allows alveoli to, increase in volume / expand / stretch / stop bursting / recoil ; 8 R contract
- 9 (alveolar type II cells secrete) surfactant ;
- 10 (so) reduces surface tension;

[max 4]

[Total: 10]

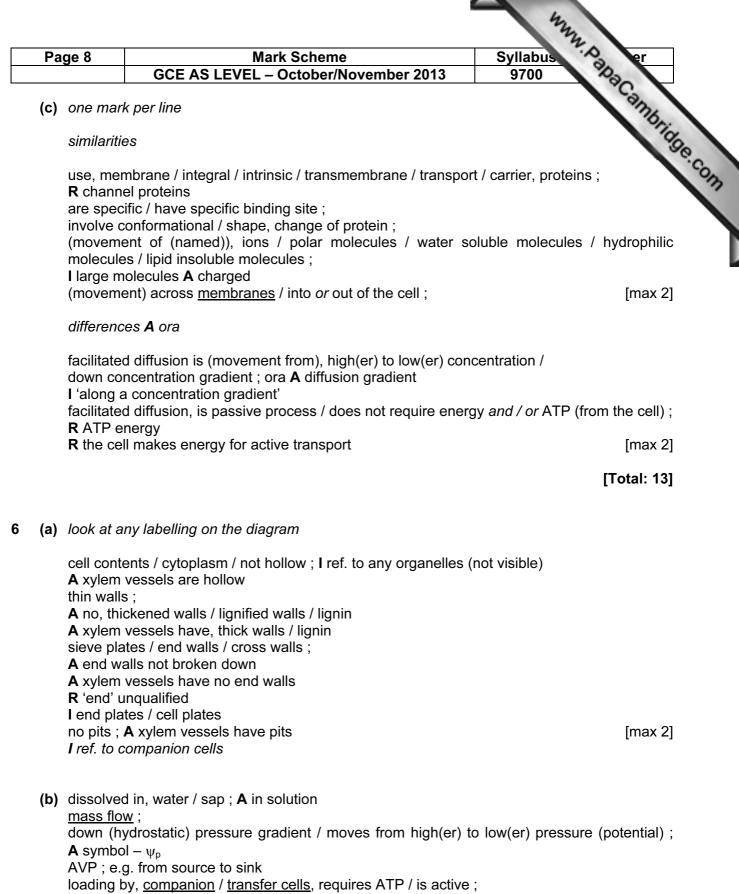
Page 7	Mark Scheme	Syllabus ser
	GCE AS LEVEL – October/November 2013	9700
(a) mar	k both parts together to a maximum of four marks	Cambric
1	(polymer / polysaccharide of) β -glucose ; allow glucose if β	3 given for bond
2	$(1-4, \beta)$ glycosidic, bonds / linkages ; A glucosidic	-00
	R if 1-6 also given	-On
3	ref. to (β) glucose units, linked at 180° to each other / alter	mately orientated / AW ;
4	many –OH groups projecting out (in different directions);	

- 5 (a) mark both parts together to a maximum of four marks
 - (polymer / polysaccharide of) β -glucose ; allow glucose if β given for bond
 - 2 $(1-4, \beta)$ glycosidic, bonds / linkages ; **A** glucosidic R if 1-6 also given
 - 3 ref. to (β) glucose units, linked at 180° to each other / alternately orientated / AW;
 - 4 many -OH groups projecting out (in different directions);
 - 5 unbranched (polymer) / straight chain / linear ;
 - 6 many hydrogen bonds between molecules ;
 - 7 (straight chain allows) molecules lie parallel to each other;
 - 8 (form) microfibrils ;
 - 9 many microfibrils form (cellulose) fibres ;
 - 10 ref. to fibres at angles / criss-cross / AW;
 - 11 (cellulose) <u>cell wall</u> is permeable ; A idea of many gaps, in wall / between fibres, allowing passage of water / (named) substances
 - 12 ref. to strength to, prevent cell bursting / withstanding (turgor) pressure / AW; [max 4]
 - (b) (i) data quote may help to decide if mp2 is matched units must be used at least once in the answer to award mp3
 - 1 as retention time increases percentage of cell wall material digested increases / positive correlation; A 'time for digestion' / reverse relationship R directly proportional
 - 2 results scattered / not all animals fit the pattern / varying percentages for the same retention time ; not just a data quote
 - 3 data guote with units (% and h) using both axes ; e.g. (highest percentage) 65% at 78 hours (lowest percentage) $35.5 \pm 0.5\%$, 35 hours
 - 4 no retention time shorter than 35 hours and none longer than 88 hours ; A lowest / shortest and highest / longest A reverse relationship A 'time for digestion'
 - none of the (24) herbivores can digest the cell wall material completely; 5 A no more than 65% is digested not just a data quote

[max 3]

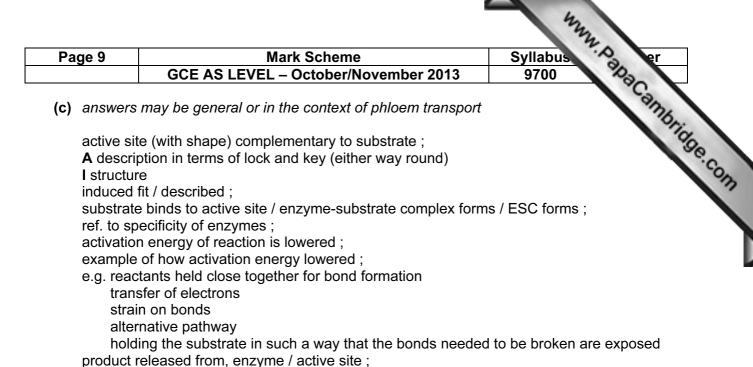
- (ii) more digestion means that there is more energy available to the animal; ora = undigested material means less energy to the animal
 - more digested material means more energy for, secondary consumers / carnivores / 2 next trophic level / for the food chain ; ora
 - 3 more digested material means more trophic levels; ora
 - 4 more undigested material provides more energy to decomposers / AW :
 - 5 AVP ; e.g. ref. to (named) animal productivity A secondary, production / productivity

[max 2]



I ATP required for mass flow

[max 2]



A enzyme can be used again / enzyme unchanged at end of reaction

[max 3] [Total: 7]