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

# www.papacambridge.com MARK SCHEME for the May/June 2012 question paper

### for the guidance of teachers

## **9700 BIOLOGY**

9700/22

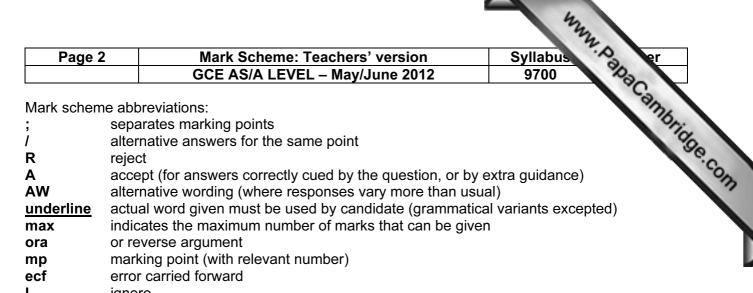
Paper 2 (AS Structured Questions), maximum raw mark 60

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 must be read in conjunction with the question papers and the report on the examination.

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

Cambridge is publishing the mark schemes for the May/June 2012 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



I ignore

Page 3			heme: Teachers' version	Syllabus	A er
		GCE AS/	A LEVEL – May/June 2012	9700	Day
(a)		k each column			Papa Cambridge
	(passive	<i>t mechanism</i> / simple) diffusion osis / phagocytosis	<pre>R facilitated diffusion  };</pre> R bulk transport		30
	- · · - · · - · ·   -				
			s / named ion <b>A</b> polar / hydrophilic	molecules } ;	[2]
(b)	glucose accept a water ignore c	/ amino acids / ion: <i>ny relevant</i>	materials if given in addition to tra	};	

[Total: 6]

			×	A
Page 4	Mark Scheme: Teachers' version	Syllabus	·Q.	er
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#### 2 (a) allow immunoglobulin for antibody

\_

structure	name of structure	function of structure within plasma cell
A	<u>nucleus</u> ; A (eu)chromatin R heterochromatin R chromosome	ref. gene(s) / genetic information / genetic material / DNA, (coding) for, antibody / protein / polypeptide ; transcription (occurring) / mRNA synthesis ; AW (ref. antibodies) allow ecf for nucleolus
В	mitochondrion ; <b>A</b> mitochondria	provides / synthesises / produces / makes, <u>ATP</u> (for antibody synthesis / exocytosis) ; <i>treat as neutral other uses of ATP</i> <i>allow ecf for lysosomes</i>
С	<u>rough</u> endoplasmic reticulum ; ignore RER	synthesis / modification / processing / transport, of, antibody / protein / polypeptide ; <b>A</b> translation <i>allow ecf for Golgi or SER or ER</i>

[max 6]

(b) (i) 1 part of the immune response ; A primary / secondary, response

many plasma cells

- 2 to produce high, concentration / level / AW, of, antibody / immunoglobulin ;
- 3 (high concentration antibody so) more effective against pathogens / AW;

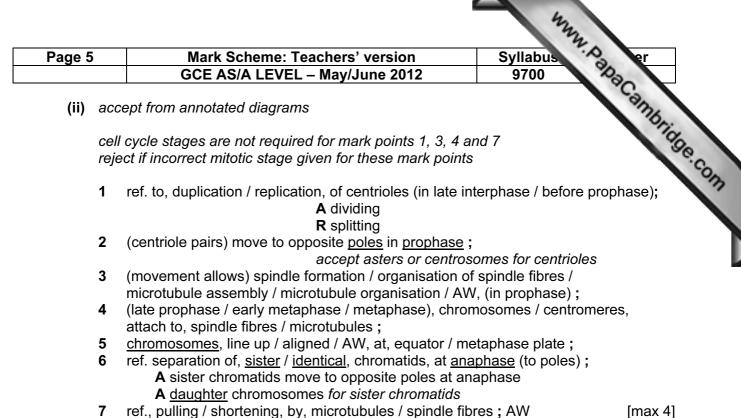
identical plasma cells

4 specific / particular / AW, to an, antigen / epitope;

in context of antibodies or plasma cells

- 5 antibody (molecules) produced are all the same ; A ora, qualified
- 6 only the gene coding for particular antibody, switched on / transcribed / expressed ;

[max 3]



7 ref., pulling / shortening, by, microtubules / spindle fibres ; AW

[Total: 13]

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3 (a) max 3 if no attempt at comparison

#### evaporation

- www.papaCanibridge.com 1 formation of water vapour from water / conversion of water from liquid (form) to gas form);
- 2 requires, energy / heat;
- 3 (water loss) from, surface / cell walls, of (spongy) mesophyll (cells);

#### transpiration

- 4 idea of loss of water vapour, to external atmosphere / from the aerial parts of a plant; A from leaves
- 5 ref. diffusion, down water potential gradient / from high to low water potential / from less negative to more negative water potential;  $\mathbf{A} \Psi$  for water potential
- 6 through stomata;

#### air spaces

- 7 correct ref. to, intercellular / air, spaces; e.g. evaporation into air spaces, diffusion from air spaces through stomata [max 4]
- (b) (i) max 3 if no attempt at explanation penalise once for lack of units mp for describing shown by (D) mp for explaining shown by (E)

#### temperature

- **T1** (D) (mean) transpiration rate hot dry day lower than warm dry day ; **A** lower than warm rainy day A lowest rate
- T2 (D) comparative data quote to support ;
- T3 (E) stomata close to prevent excess water loss / excessive water loss causes closure of stomata; AW

humidity

- H1 (D) (mean) transpiration rate warm dry day higher than warm rainy day; A highest rate
- H2 (D) data quote to support;
- H3 (E) decrease in / low, humidity increases rate of, transpiration / evaporation / diffusion ; ora
- **H4** (E) more steep / AW, water potential gradient;

#### stomatal density

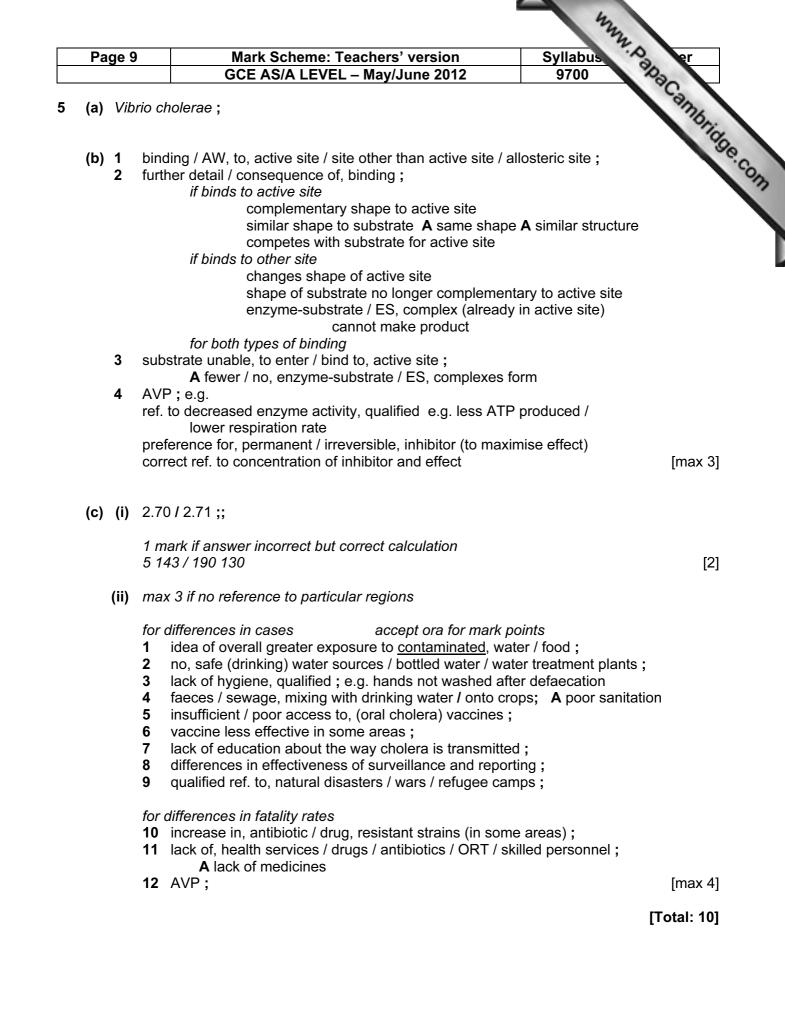
- **S1** (D) peach (mean) transpiration rate, lowest / lower than, apple / sour cherry;
- S2 (D) data quote to support :
- **S3** (E) ref. (far) fewer stomata (mm<sup>-2</sup>) so less water (vapour) lost ;

#### AVP; e.g. ref. ABA and stomatal closure (T)

less water (vapour) leaves plant as only cuticular transpiration possible (T) ref. to higher rate for apple (dry days) and suggestion that stomata are larger [max 4]

Page 7	Mark Scheme: Teachers' ve		Syllabus 🔗 er
	GCE AS/A LEVEL – May/Jun	ne 2012	9700 23
sto	creased / lower, rate during night ; ora mata closed at night ; ora ther detail ; e.g. closed to prevent wate closed as no photosynthes no light for photosynthesis open (during day) for, gas	sis	Syllabus 9700 Brocenhuing [3]
(iii) pea	ach / Prunus persica / P. persica ;		[1]
( <b>c) (i)</b> (re	pairing damaged DNA) reduces risk of c	cancer; A prevents	3
furt e.g	ther detail ; <i>in context of reducing risk</i> j. because tobacco smoke contains m because tobacco smoke contains ca ref. to mutation (as result of damage	arcinogens	[2]
(ii) red	luces risk of, <u>chronic</u> bronchitis / emphys	sema / COPD ;	
e.g	ther detail ; <i>in context of reducing risk</i> J. (reducing inflammation) duces risk of infection events excess mucus production <b>R</b> if	f linked to emphyser	na
pre	•		
pre pre	•	f linked to bronchitis	[2]

	a er
GCE AS/A LEVEL – May/June 2012 9700	Dec.
(a) (i) DNA because	apacamprios
RNA (has uracil) does not have <u>thymine</u> ;	10
(ii) phosphodiester ;	
(iii) deoxyribose ;	[1]
(b) collects / attaches to, specific amino acid	
takes specific amino acid / activated tRNA, to ribosome $\int$ ,	
idea of, adjacent / two, amino acids and codon-anticodon binding ;	
peptide bond formation / ref. elongation, (to form polypeptide);	[max 2]
(c) accept points from a diagram	
1 loss of a water molecule / condensation reaction ;	
2 OH / O <sup>-</sup> , from, carboxyl / -COOH / COO <sup>-</sup> (group) of one amino acid ;	
<ul> <li>3 H / H<sup>+</sup>, from, amine / NH<sub>2</sub> / NH<sub>3</sub><sup>+</sup>(group) of other amino acid ;</li> <li>2/3 allow one mark for ref. to involvement of carboxyl and amine group</li> </ul>	
1 (nantida hand) linka C. N.	[3]
4 (peptide bond) links C–N ;	



Р	age 1	Mark Scheme: Teachers' version	Syllabus P er
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6 (a			Sambridge.c
	A; B;		190
	<b>F</b> ;		.9
(ŀ	n) do	not accept list ATP, DNA, RNA, phospholipid as these mus	st he qualified
(~	<i>y</i> uc		

- 4
- 5
- 6
- phospholipid for membranes; DNA replication (for cell division); RNA for, protein synthesis / AW; AVP; e.g. activate glucose for glycolysis ref. NADP, light-dependent reaction 7

[max 3]

[Total: 7]