OCR
RECOGNISING ACHIEVEMENT

GCE

Biology

Advanced GCE **A2 H421**

Advanced Subsidiary GCE **AS H021**

Mark Scheme for the Units

January 2010

HX21/MS/R/10J

Oxford Cambridge and RSA Examinations

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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F211 Cells, Exchange and Transport

Question			Expected Answers	Marks	Additional Guidance
1	(a)		1500 ;		**ACCEPT** 1400 **and** 300,000 for 1 max only
			500 000 ;	2	
1	(b)		ability to see (two) objects (that are close together) as separate objects / AW ; see detail ;	2	**ACCEPT** ability to distinguish two objects **IGNORE** clarity / clear
1	(c)	(i)	transports water (up plant) ;		**ACCEPT** alternative wording for transport e.g. movement **DO NOT ACCEPT** up **and** down **DO NOT ACCEPT** water and sugars
			transports, minerals / ions, (up plant) ;		**ACCEPT** alternative wording for transport **IGNORE** ref nutrients / solutes **DO NOT ACCEPT** sugars
			support (plant / stem / shoot) ;	1 max	**ACCEPT** keeps plant upright

Question			Expected Answers	Marks	Additional Guidance
1	(c)	(ii)	*Functions:* **F1** (lignin), strengthens / thickens**,** the (xylem) <u>wall</u> **;** **F2** waterproofing (wall) / AW **;** **F3** (improving) adhesion of water (molecules) **;** **F4** (spiral) pattern allows flexibility / stretching / movement**;** **2 max**		**ACCEPT** support only if in specific context of supporting the xylem <u>wall</u> **ACCEPT** waterproofs cell **DO NOT ACCEPT** adhesion **and** cohesion when used together Flexibility / stretching must ref, *pattern* of lignin laid down i.e. spirals
			Explanation: **E1** prevents collapse of xylem **;** **E2** (water) under tension / at low pressure / negative pressure**;** **E3** reduces (lateral) loss of water, through wall **;** **E4** increases capillarity / AW **;** **E5** prevents stem breaking / AW **;** **2 max**	**3 max**	*Award mark(s) for function and explanation independently* **DO NOT CREDIT** loss of water unqualified

Question			Expected Answers	Marks	Additional Guidance
1	(c)	(iii)	(pits) allow water to move**,** in / out / between, <u>vessel</u>(s) **;** to bypass blockage **;** supply water to other**,** tissues / (other types) cells / parts of plant **;**	**2 max**	**ACCEPT** lateral movement for 'out' **ACCEPT** bypass air lock **ACCEPT** any named, tissue / cells e.g. to allow water to other tissues 1 mark to allow water out to other tissues 1 mark to allow water out of vessel to other tissues 2 marks
			Total	**10**	

Question			Expected Answers	Marks	Additional Guidance
2	(a)	(i)	collection / group, of cells (of one or more types) ;	2 max	**IGNORE** ref similar cells
			(cells), working together **OR** with, common / same, function ;		**ACCEPT** a group of cells with a function = 2 marks
			specialised (cells) ;		**DO NOT CREDIT** differentiated
2	(a)	(ii)	squamous / ciliated ;	1	**ACCEPT** endothelium / columnar **DO NOT ACCEPT** cilia, goblet cell, ciliated *cells*
2	(b)		(organ is) a collection of tissues / named tissues ;	2	Look for idea of more than one tissue **ACCEPT** two or more correctly named tissues from: epithelium, elastic, glandular, smooth muscle, blood, nervous, cartilage, connective
			(working together) to enable gas exchange / AW ;		**DO NOT ACCEPT** perform a function unqualified – we want to know *what* function (can be named or described) **DO NOT ACCEPT** respiration **IGNORE** breathing

Question			Expected Answers	Marks	Additional Guidance
2	(c)	(i)	(*release of energy*) mitochondria **;**	1	
		(ii)	*(movement of cilia)* cytoskeleton **;**	1	**ACCEPT** mitochondria if not used in **(i)**
		(iii)	*(secretion of mucus)* Golgi (vesicle) **;**	1	**ACCEPT** cytoskeleton if not used in **(ii)** **ACCEPT** Golgi body / apparatus **DO NOT ACCEPT** Golgi vessel
			Total	8	

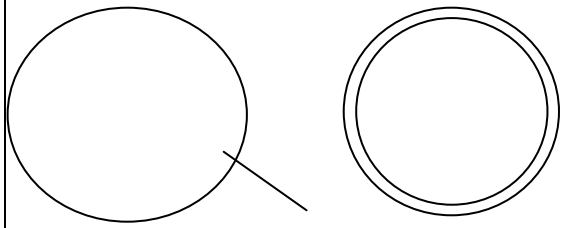
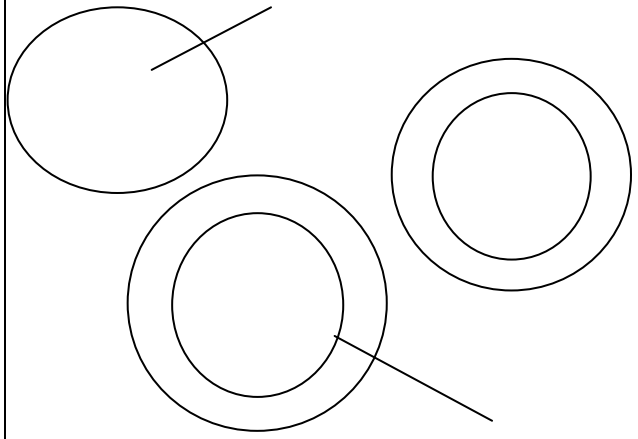
Question			Expected Answers	Marks	Additional Guidance
3	(a)		partially / selectively ; (facilitated) diffusion **OR** osmosis ; plasma ; phospholipids ; cholesterol ;	5	**DO NOT ACCEPT** semi **ACCEPT** differentially **ACCEPT** plasma cell

Question			Expected Answers	Marks	Additional Guidance
3	(b)				***Look for <u>description</u> not list of functions***
			1 (acting as) **antigens ;** **2** identification / **recognition**, (of cells) as**,** self / non-self / AW **;** **3** **cell signalling** / described **;** **4** **receptor** / binding site, for, **hormone** / (chemical) signal / (medicinal / named) drugs **;** **5** ref. to **receptor** / binding site / trigger, on transport proteins / AW **;** **6** cell **adhesion** / to hold cells together (in a tissue) **;** **7** attach to water molecules (to stabilise membrane / cell) **;** **4 max** for description		*Do not credit repetition of same point* **ACCEPT** foreign for non-self **ACCEPT** description e.g. communication *between* cells / cell responds to, chemical / signal, *from another cell* **ACCEPT** description of *attachment process* for receptor / binding site **DO NOT ACCEPT** molecule unqualified **ACCEPT** binding site for foreign antigen **ACCEPT** ref to receptors on ion channels **ACCEPT** bind to other cells for cell adhesion
			QWC: **three** technical terms used and spelt correctly **;**	**5 max**	Any **three** from: receptor, antigen, hormone, <u>cell</u> signal(ling), adhesion, recognition, <u>facilitated</u> diffusion, <u>active</u> transport
			Total	**10**	

Question			Expected Answers	Mark	Additional Guidance
4	(a)		timer **OR** scale / ruler **;**	1	
4	(b)				***Mark the first three suggestions*** *irrespective of numbered points* *IGNORE reasons – just mark* ***steps*** *in the process*
			shoot is healthy **;**		**ACCEPT** shoot not wilted
			assemble apparatus / cut shoot**,** under water **;**		
			cut last 2-3 cm off cut end / cut at an angle **;**		**ACCEPT** cut end off shoot
			check there are no air bubbles in apparatus **;**		**ACCEPT** make sure cut end of shoot is in contact with water once apparatus assembled
			apparatus**,** water tight / air tight / has no leaks **;**		**ACCEPT** screw clip tight **DO NOT ACCEPT** use Vaseline unqualified
			leaves dry **;**		
				3 max	**DO NOT CREDIT** allow time for acclimatisation, equilibration

Question			Expected Answers	Mark	Additional Guidance
4	(c)	(i)	25.3 ;	1	**IGNORE** any units
4	(c)	(ii)	to make results (more) reliable ;		**DO NOT ACCEPT** accurate **and** reliable (use of **both** terms) anywhere in the answer
			to help identify anomalies ;	2	Look for idea of spotting the anomaly e.g. spot, notice, recognise, show, detect. **DO NOT CREDIT** prevents / take out / remove / accounts for, anomalies **DO NOT CREDIT** 'ensure there is no anomaly' unless qualified **ACCEPT** outliers for anomalies **ACCEPT** to identify other factors / (uncontrolled) variables that may be having an effect
4	(c)	(iii)	*in afternoon:* plant dying / less healthy / wilting ; ref to stomatal closure ; more humid / higher water (vapour) potential in air ; less air movement / wind / draughts ;	2 max	*Mark first response in each numbered section (1-2). If not all sections are used, return to the first section and mark further suggestions* Assume answer is for different conditions in the afternoon **ACCEPT** ORA if stated 'in morning...' **IGNORE** ref to light / dark Look for **comparative** statements – higher, greater etc **DO NOT CREDIT** more **moisture** in air

Question			Expected Answers	Mark	Additional Guidance
4	(c)	(iv)	(potometer) measures (water) uptake **;**		
			not all water (taken up) is lost **;**		**ACCEPT** ref to figs e.g. 99% water *taken up* is lost **ACCEPT** the assumption that water loss is equal to water uptake is incorrect
			some water used (in photosynthesis / making cells turgid) **;**	**2 max**	
			Total	**11**	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	vein with thinner wall than artery **;**	1	**CREDIT:** Correct position of endothelium as indicated by circle or label line Must be clearly **thinner** than shown on artery  **DO NOT CREDIT**: 

Question			Expected Answers	Mark	Additional Guidance
5	(a)	(ii)	*Arteries have:* no valves **;** endothelium / tunica intima, folded / AW **;** more / thicker, muscle / elastic tissue / tunica media **;** more / thicker, collagen / tunica externa **;**	**2 max**	*Assume answer refers to wall of artery.* **IGNORE** any ref to artery wall being thicker, unqualified, as this has already been stated in the question **IGNORE** *reasons for differences* **ACCEPT** ORA if stated - 'vein is…...' Look for **comparative** statements **ACCEPT** tunica adventitia for tunica externa
5	(b)	(i)	contraction of <u>ventricle</u>, wall / muscle **;**	**1**	**ACCEPT** ventricular systole **DO NOT CREDIT** heart muscle unqualified **DO NOT CREDIT** contraction of atria **and** ventricles **DO NOT CREDIT** pump / squeeze / push / beat without ref to contraction

Marks			Expected Answers	Mark	Additional Guidance
5	(b)	(ii)	more, (smaller) vessels / named vessels ;		**ACCEPT** *divides* into smaller vessels (implies more of them)
			(vessels) have larger, total lumen / cross sectional area ;		**ACCEPT** larger total surface area
			reduced resistance to blood flow ;		**DO NOT CREDIT** further from the heart
			arteries, stretch / expand ;		
			loss of, fluid / plasma, from capillaries ;	2 max	**DO NOT CREDIT** loss of, blood / water **DO NOT CREDIT** loss of fluid / plasma, unqualified or from other vessels
5	(b)	(iii)			*Assume 'it' refers to plasma:*
			plasma / fluid, moves out of, capillary / blood ;		**DO NOT CREDIT** water / diffuses out **ACCEPT** filters out
			enters / forms, tissue fluid ;		
			(plasma) proteins, remain in capillary / too large to pass through capillary wall / AW ;		
			(fluid moves) down pressure gradient ;		
			hydrostatic pressure greater than, water potential / Ψ;	3 max	**DO NOT CREDIT** ref to osmosis

Marks			Expected Answers	Marks	Additional Guidance
5	(c)		**X** = carbonic anhydrase **;**		**ACCEPT** correct phonetic spelling **DO NOT ACCEPT** anahydrase
			Y = carbonic acid / H_2CO_3 **;**		If formula only given, it must be correct. Incorrect formula can be ignored if correct name given.
			Z = hydrogen (ion) / H^+ **;**	**3**	**DO NOT CREDIT** H alone
			Total	**12**	