UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

5126 SCIENCE (CHEMISTRY AND BIOLOGY)

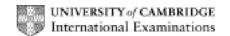
5126/04 Paper 4 (Theory (Biology)), maximum raw mark 65

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Section A

1	(a)	(i)	Any two from: no chloroplasts; no cell wall; no large / central vacuole;	
				[max. 2]
		(ii)	control passage of substances into; and out of cell;	[2]
	(b)	(i)	root hair cell	[1]
		(ii)	elongated part / hair; gives large surface area; for rapid absorption of water;	[3]
			ון	otal: 8]
2	(a)	(i)	passage of water; from region of high water concentration to region of low water concentration / down a water concentration gradient; through a partially permeable membrane;	[2]
				[3]
		(ii)	when water concentration of cell sap lower than epidermal cells; water passes by osmosis into guard cells making them swell and open stoma;	[2]
	(b)	(i)	carbon dioxide + water \rightarrow glucose + oxygen; (accept <u>correct</u> symbol equation $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$)	[1]
		(ii)	carbon dioxide enters through stomata; by diffusion (from air);	[2]
		(iii)	water is lost through stomata; oxygen is lost through stomata;	[2]
			[То	otal: 10]
3	(a)	(i)	points correctly plotted +/- one small square (one mark lost for each error);;	[2]
3	(α)			
		(ii)	straight line drawn within +/- one small square of each point;	[1]
	(b)	rea	d +/- one small square from graph (expect 174);	[1]
	(c)	(i)	by haemoglobin; in red blood cells;	[2]
		(ii)	glucose + oxygen → carbon dioxide + water;	[1]

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	(iii) at higher speed muscles are used more / more active / contract more frequestion rate increases so more oxygen / oxygenated blood needed;				•
		пеаг	t rate increases to supply more oxygen / oxygenated b	olood	[3] [Total: 10]
4	` '		of toxic materials; te products of metabolism (from an organism);		[2]
	(b) (i)	and	er; urea; ause concentration higher in urine than plasma;		[3]
	(ii)		no acids broken down to urea; e liver;		[2]
	(c) (i)		on dioxide;		[1]
	(ii)	one	surface area; cell thick; st surface;		[3] [Total: 11]
5	(a) (i)		at night / minimum at about 05.00; in day / maximum at about 14.00;		[2]
	(ii)		osynthesis requires energy from sunlight; occurs in daylight / maximum when light brightest;		[2]
	(b) (i) (ii)		ar concentration in stem increases after that in leaves;		[1] [1]

[Total: 6]

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Section B

6 (a) *differences*: sexual requires two parents, asexual only one;

sexual involves male and female gametes, asexual does not;

sexual produces genetically different offspring, asexual identical; [max 2]

advantages: sexual allows variation;

asexual allows more rapid growth of population / asexual can occur easily in a widely dispersed population; [2]

(b)

	R	r
r	Rr red	rr blue
r	Rr red	rr blue

any appropriate style of diagram showing alleles in gametes of parents;

two Rr offspring;

two rr offspring;

Rr identified as red;

rr identified as blue:

50 red and 50 blue;

(allow ecf at all stages)

[6]

[Total: 10]

7 (a) Any six from:

set up container with starch solution;

one container for each pH value;

add amylase and start timer;

remove samples at time intervals and test with iodine;

note time when no longer blue;

keep concentration and volumes of starch and amylase the same;

carry out at same temperature each time;

(allow valid alternative methods)

[6]

(b) soluble products of digestion;

pass through wall of small intestine/capillary wall;

into the blood (capillaries);

undigested food molecules too large to pass through / only digested food molecules small enough to pass through;

[4]

[Total: 10]

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8 (a) Any seven from:

bacterial feed on sewage in river / sewage causes bacteria to increase in number; oxygen is used up;

fish / aerobic aquatic organisms die;

sulfur dioxide dissolves to form acid rain;

which kills trees / kills fish in lakes / erodes statues / damages buildings;

insecticide washed into rivers / blown over land;

insecticide accumulates up food chain / trophic levels;

poisons fish / toxic to humans / kills useful insects;

[7]

(b) paper is made from trees;

the more paper recycled the fewer trees need to be cut down; more trees means more carbon dioxide removed from the air / less greenhouse effect / less global warming;

[3]

[Total: 10]