UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

Specimen for 2007 (version 2)

GCE A LEVEL

MARK SCHEME

MAXIMUM MARK: 30

SYLLABUS/COMPONENT: 9700/05

BIOLOGY PLANNING, ANALYSIS AND EVALUATION

Question		n	Expected answer	Mark	AO
1	(a)	(i)	As the concentration of carbon dioxide increases the rate of photosynthesis increases (until another factor becomes limiting);	1	Ρ
		(ii)	Independent: concentration of carbon dioxide/hydrogen carbonate solution;		
			<i>Dependent:</i> Volume/amount of gas/oxygen collected; <i>Accept</i> , rate of photosynthesis	2	Ρ
	(b)	any	7 5 of:		
			to a range of hydrogen carbonate solutions of known concentration; cept, ref. to expose to atmosphere with different known concentrations of CO ₂		
		ref.	to gas syringe plunger fully inserted;		
		ref.	to inserting stopper after attaching syringe;		
		ref.	to equilibration time before measuring any gas produced;		
		ref.	to reading volume after specific time;		
		time	e to collect stated volume;		
		ref.	to repeating each measurement;		
		AVI	P (e.g. detail of means of ensuring that gas syringe is read accurately/consiste	ntly); 5	М
	(c)	ider	ntification of 4 appropriate variables;	1	Ρ
		qua	intity of aquatic plant – same mass/number of leaves/same plant;		
		volu	ume of test solution – same volume of each concentration;		
			perature – immerse the test solution in water bath at same perature/use an air conditioned room;		
		mea	t intensity – use same light source at same distance from plant/means of cor asuring light intensity (in dark room/enclosed box); /e length – use same light source with same voltage/current/power/light tempe		-
	(d)	are	f: es dissolved in the pond water are removed/only gases from the plant collected; roscopic plants that may use carbon dioxide are killed;	1	М

(e)	1 of:		
	hazard associated with hydrogen carbonate solution;		
	hazard assocaiated with the source of the pond water;	1	Ρ

5P

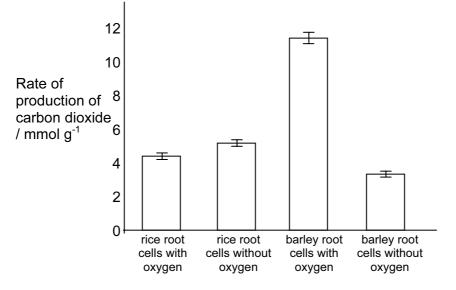
Total 15 10M

Question			Expected answer	Mark	AO
2	(a)	(i)	0.14;	1	D
		(ii)	barley root cells with oxygen is less reliable than the others;		
			spread of data /standard deviation/standard error is greater;	2	D
			OR		
			significant difference between (all of/any of) treatments;		
			error bars do not overlap;		
		(iii)	axes correct orientation and labelled;	1	D
			all plots correct (means 4.5,5.5,11.4,3.3);	1	D

error bars plotted from standard error; 1 D

error bars correctly placed and plotted; 1 D

(allow error carried forward if standard deviation used)



(b) 3 of ref. to:

rice without oxygen grows better than rice with oxygen;

rice is adapted to grow in anaerobic/water logged conditions, grows better than barley without oxygen;

rice can tolerate the ethanol produced by anaerobic respiration/barley seeds killed by ethanol produced by anaerobic respiration;

aerobic respiration releases more energy than anaerobic, barley grows	3	С	
faster/more with oxygen;			
		7D	

Total 10 3C

5

Question Expected answer

3 (a)
$$\frac{(7.5-6.2)}{6.2} \times 100 = \frac{1.3}{6.2} \times 100 = 0.21 \times 100 = 21\%;$$

accept 21.0% or 20.97% reject 45% as obvious but incorrect

(b) support

mean value of experimental cell culture is higher (than control); bottom or range higher / top of range higher, in experimental cell culture (than control) / AW;

does not support

range overlaps / ref. to specific examples of control and experimental samples which are the same (e.g. control 6 and experimental 8 which are both 6.5);

ref. to possible anomalies / specific named anomaly from the list experimental samples 4 or 7 / control samples 3 or 5 or 10;

ref. to insufficient replication (for such variable data);

no statistical test of difference carried out / do not know if the difference is significant / no chi squared test / no t-test / no standard error bars plotted;

only one concentration tested / ref. limited range / AW; [max 4]

[1]

Mark AO