OCR
RECOGNISING ACHIEVEMENT

GCE

Science

Advanced Subsidiary GCE **2844**

Science and Environmental Management

Mark Scheme for June 2010

Oxford Cambridge and RSA Examinations

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question			Expected Answers	Marks	Additional Guidance
1	a		1 mark for each correct label	5	
	b		Anther;	1	
	c		Description of: Wind; Insects (including named example); Birds; Paintbrush; any 2	2	
	d		Pollen transferred to stigma; Pollen tube grows down to ovary; Male gametes travel down tube to ovary;	3	
	e		To introduce new desirable characteristics; To get pest resistance; Increase yield; Better flavour; Or any sensible suggestion; any 2	2	
	f		Can end up with unwanted characteristics/ unpredictable;	1	
			Total	**14**	

Question			Expected Answers	Marks	Additional Guidance
2	a		Sugar phosphate backbone; Bases attached to sugars; Bases paired with each other; Correct AT, GC pairing;	4	
	b		Hydrogen/H bonds	1	
	c	i	20 different amino acids;	1	
		ii	Triplet code/3 bases code for 1 amino acid; Can code for 64/ more than 20 amino acids/ some amino acids have more than one codon;	2	
	d	i	RNA single stranded; RNA has U instead of T;	2	
		ii	mRNA transcribes/ makes a complimentary copy of DNA/gene; mRNA passes from nucleus to ribosome; mRNA has codon; codon pairs with anticodon on tRNA; tRNA brings amino acids to mRNA; There is a specific tRNA ro each amino acid; Amino acids join together to make protein; Any 4	4	
	e		Different amino acid inserted in protein/ stop codon can cause termination of chain; Protein folding/tertiary structure may be affected; Function dependent on structure/ example given;	3	
			Total	**17**	

Question			Expected Answers	Marks	Additional Guidance
3	a		Same place; Same depth; Same time of year; Same weather conditions; Same time of day; Any other sensible suggestion	3	
	b	i	Filter transmits coloured light; Coloured light absorbed by solution; Absorbance α conc. of solution; Picked up by photocell; any 3 Filter : anything but green;	4	
		ii	Correct axes; Correct scales; Correct plotting;	3	
		iii	Correct reading from graph; Graph annotated to show how the figure was obtained;	2	
	c	i	Vapour/gas;	1	
		ii	Electrons; Jump to higher energy levels (when provided with energy); When they fall back down; They emit/give out energy; Set quantity of energy/quantum; E=hxf / E α f; any 5	5	
			Total	**18**	

Question			Expected Answers	Marks	Additional Guidance
4	a		Salt; Mud/sand; Bacteria; Pollutants/named pollutant; Fishes etc; Any reasonable suggestion; any 2	1	
	b		Semi permeable membrane allows passage of water molecules; But not larger molecules; Water molecules can pass in both directions; In normal osmosis water passes from region of high water conc. to low; Pressure on polluted side causes water molecules to flow in opposite direction/ to clean side; More collisions with membrane; Salt/pollutants etc (too big) left on seawater side; any 5	5	
	c		Beer making; Pharmaceuticals; Electronics; Boilers; any 2	2	
	d	i	Water molecules are in random motion; In collision with molecules of membrane; root cell membrane is semi permeable; water molecules can fit through holes in the membrane; water moves in both directions; any 3	3	
	d	ii	When the solute concentration is greater inside the cell than outside ora; AW when water concentration/number of water molecules is greater outside than inside the cell ora;	1	

		iii	It wilts;	1	
		iv	Leaf firing; Leaf rolling; Wide/deep roots; Waxy/small leaves;	2	
	e	**i**	Economic;	1	
		ii	Irrigate; Use drought resistant varieties;	2	
			Total	**18**	

Question			Expected Answers	Marks	Additional Guidance
5	a		**Technology:** Identify required gene; Obtain required gene using restriction enzyme; This is passenger DNA; Insert into vector; virus/bacterial plasmid; (DNA) ligase enzyme; This is recombinant DNA;method of inserting into host; select for modified plants; max 4 **Problems to environment:** GM crops with resistance to pests/weedkiller could cross breed with wild varieties to produce super weeds; As yet unknown health hazards; Reduction of biodiversity; max 2 **Advantages:** Pest resistence; Longer shelf life; Drought resistance; Improved nutritional value; Any other sensible advantage; max 2	8 QWC 4	QWC **organization & vocabulary** 2 marks **A** answer is clearly and coherently organized throughout **and** **B** appropriate specialist vocabulary is used extensively; 1 mark **A** answer shows a degree of organization **and** **B** some appropriate use of specialist vocabulary is made; 0 mark **A** answer is not organized **and** **B** appropriate specialist vocabulary is not used; **legibility & grammar** 2 marks **A** text is clearly legible **and** **B** spelling, punctuation, grammar are accurate throughout; 1 mark **A** text is untidy but can be read without difficulty **and** **B** spelling, punctuation, grammar show some mistakes; 0 mark **A** text is difficult to read; **and** **B** spelling, punctuation, grammar show extensive mistakes; (Candidates must satisfy both strands A and B to gain the marks at a particular level. Otherwise the marks for a lower level should be awarded.)

	b		Chance of the event happening; Consequence of the event happening;	2	
			Total	**14**	

Question			Expected Answers	Marks	Additional Guidance
6	a	i	Contains chloroplasts/chlorophyll/ absorbs light;	1	
		ii	Allows CO_2 to diffuse into leaf/ O_2 out;	1	
		iii	Binds with CO_2;	1	
	b		O_2 is a competitive inhibitor/ prevents CO_2 binding; To RuBisCo;	2	
	c		In C4 plants, CO_2 remains in cytoplasm/ doesn't enter chloroplast; Is converted to malic acid/ C4 compound; Sent to bundle sheath cells; Away from O_2 ; Malic acid releases CO_2 (into bundle sheath cell); Into C3 cycle; any 4	4	
			Total	**9**	

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