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**ENVIRONMENTAL MANAGEMENT**

**5014/21**

Paper 2

**May/June 2016**

MARK SCHEME

Maximum Mark: 60

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**Published**

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(a)	10.2; 34.0/3.9/3.99;	<b>2</b>
1(b)(i)	three correct squares shaded;;;	<b>3</b>
1(b)(ii)	1115 – 675/440;	<b>1</b>
1(b)(iii)	correct use of scale to give answer in the range 330–390m <sup>2</sup> ;	<b>1</b>
1(b)(iv)	922 × answer from (ii) so answers in the range 304 260 to 359 580 (g);	<b>1</b>
1(b)(v)	the root system of plants; is also biomass;	<b>2</b>
1(b)(vi)	repeat (with more squares)/to control variables/to use a standardised procedure;	<b>1</b>
1(c)(i)	<i>any 2 of:</i> the biomass is increasing; increased by 430g between year 1 and 3; greater increase between year 1 and 2 than 2 and 3; further comment using figures e.g. grows about 200g per year; biomass nearly doubles between year one and two/eq; less recovery between year 2 and 3; AVP;	<b>2</b>
1(c)(ii)	(plan to) protect damaged/unprotected saltmarsh/eq for more than three years/up to five years for complete recovery/know how long for the saltmarsh to recover/needs to be protected;	<b>1</b>
1(d)(i)	<i>any 3 of:</i> identify species (with a key/eq); count the number of different species; use of suitable scale e.g. ACFOR; found in each quadrat; process data e.g. find average; find diversity index;	<b>3</b>
1(d)(ii)	table drawn; headings; 10 spaces for recording;	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(e)(i)	adds mineral nutrients; named nutrients such as N ,P ,K ; speeds up growth;	<b>2</b>
1(e)(ii)	<i>any 2 of:</i> eutrophication / described / eq; some species die out/numbers reduced; may cause disease; disrupts food chains; adds toxic substances;	<b>2</b>
1(f)(i)	<i>any 2 of:</i> produce energy / electricity; for air conditioners; and refrigerators; to make water from desalination plants; AVP e.g. long hours of darkness;	<b>2</b>
1(f)(ii)	photosynthesis; (do not accept if respiration also stated)	<b>1</b>
1(f)(iii)	prevent damage( in future from) rising sea levels; reduce possible climate change / global warming; conserves fossil fuels for longer; preserves habitats; maintains biodiversity;	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(a)	<i>any 4 of:</i> it reproduces quickly / many / 220–300 eggs; quick hatching; larvae damage trees feeding for 90 days; larvae quickly change to adults; flying adults move to new trees; 3 life cycles a year possible / one female can lay 600–900 eggs a year / eq; AVP;	<b>4</b>
2(b)(i)	<i>any 2 of:</i> concentration of chemical; temperature; food; water; same source of larvae; dosage; same species of weevil;	<b>2</b>
2(b)(ii)	<i>any 2 of:</i> as a control; to compare / eq; to find out how many would die anyway;	<b>2</b>
2(b)(iii)	5, 70, 40;;  2 correct = [1]	<b>2</b>
2(b)(iv)	<i>any 3 of:</i> all survive in water after 5 days; none survive chemicals after 5 days / eq; more males paralysed by both chemicals; water does not paralyse; females all dead after 5 days but some males alive for both chemicals; more are killed at 5 days than 2 days; use of comparative figures;;	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(b)(v)	<i>carbosulfan or dimethoate</i> <i>any 3 of:</i> kills both males and females; kills all the females; kills males quickly; kills more females after 2 days; stops reproduction / laying eggs;	<b>3</b>
2(c)	both axes labelled;; sensible scale; plots; allow $\pm \frac{1}{2}$ square for plots	<b>4</b>
2(d)(i)	spray in Jan /Feb before the population increase /to kill larvae /eq;	<b>1</b>
2(d)(ii)	masks /gloves /other protective clothing;	<b>1</b>
2(d)(iii)	biological control method /described in outline;	<b>1</b>
2(e)(i)	<i>any 4 of:</i> to maintain traditional food /culture; keep people employed; improve food security; maintain /develop export market; to develop scientific knowledge in UAE; become world leader in producing weevil resistant palms; AVP e.g. government revenue/improve standard of living	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(e)(ii)	<i>any 3 of:</i> find DNA / genes / alleles; resistant to weevil attack; reference to cloning / tissue culture produces uniform trees; genetic engineering / GM trees; drought resistant; salt tolerant; produce higher yields; top quality/highest value fruit; reference to healthy food; extra income for the country;	<b>3</b>