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**ENVIRONMENTAL MANAGEMENT**

**5014/22**

Paper 2

**May/June 2018**

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 International will not enter into discussions about these mark schemes.

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**PUBLISHED****Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)	(Oahu island and Laysan island) 1600 (km); (Oahu island and Midway island) 2300 (km);	<b>2</b>
1(b)(i)	1 418 300;	<b>1</b>
1(b)(ii)	68.8(%) ;; <i>(if answer incorrect, allow one mark for <math>976\,200 \div 1\,418\,300 \times 100</math> [1]);</i>	<b>2</b>
1(c)(i)	3 (°C);	<b>1</b>
1(c)(ii)	(driest) June <b>and</b> (wettest) December;	<b>1</b>
1(d)	<i>any three from:</i> comfortable temperature every month; low rainfall / no wet season; humidity constant; use of figures ;;	<b>3</b>
1(e)	<i>any three from:</i> more damage to land (from building) / loss of habitat / deforestation; soil erosion; risk of flooding; increased traffic; more vehicle emissions; more, air / water / noise / visual pollution; loss of biodiversity / disruption of, food chains / food web / other specific effect on wildlife; more, sewage / domestic waste ; AVP, e.g. more turbidity / cloudiness / sediment in water / shortage of water / effect of this on wildlife, e.g. less photosynthesis / death of coral / animals scared away;	<b>3</b>
1(f)(i)	11–15 <b>and</b> 16–19;	<b>1</b>

Question	Answer	Marks
1(f)(ii)	closer to the capital; easy to access; so more people visit; <i>idea of</i> , more interesting sites;	<b>2</b>
1(f)(iii)	<i>any three from:</i> broken / damaged coral; water pollution (from boats); e.g. fuel / motor oil; named example of pollution, e.g. more garbage / plastic; damage from boat / boat anchors; more fish killed; AVP, such as noise can scare away wildlife / disturb or disrupt breeding;	<b>3</b>
1(g)(i)	<i>any three from:</i> no control of the total number of collectors; no control of the number of fish caught / overfishing; no control of the type / species, of fish caught ; so the populations will become depleted / large numbers die / 90% fish die; breeding / reproduction, reduced; alter the, food chains / food web; possibility of local extinction of species / species become endangered; AVP;	<b>3</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(g)(ii)	<p><i>any three from:</i>            make the collector licence cost more;            limit the number of, licences / diving sites;            restrict number of collection sites;            set a quota for each, collector / species of fish;            create laws;            police the collectors;            enforce laws, e.g. heavy fines;            ban collection of (rare) fish species;            have a closed season;            declare a marine reserve;            AVP, e.g. making people aware / education / conservation projects / control net size / mesh size / control industrial / agricultural waste;</p>	<b>3</b>
1(h)(i)	to get, results they can compare / unbiased results / valid results;	<b>1</b>
1(h)(ii)	more data collected / more, boats / boat captains / people asked; more days / specified days (rather than any 3 days from each month);	<b>2</b>
1(h)(iii)	<p>table drawn;  <i>headings:</i>            Tues(day) and Thurs(day);            (number of) fish / ( blue) marlin caught;</p>	<b>3</b>

Question	Answer	Marks
2(a)(i)	fourth line drawn in appropriate position <b>and</b> 5 sample points on each line; equally spaced / scale used;	<b>2</b>
2(a)(ii)	systematic;	<b>1</b>
2(a)(iii)	(distance / m) 10 <b>and</b> (direction) North (235);	<b>1</b>
2(a)(iv)	the concentration (of lead) decreases with increasing distance; same pattern in all directions;	<b>2</b>
2(a)(v)	as a control; to compare with test samples;	<b>2</b>
2(b)(i)	wind direction, blows from the north east / blows to south west; higher concentrations of lead / paint chips, found (at greater distances) to south and west of buildings;	<b>2</b>
2(b)(ii)	<i>any three from:</i> lead is, toxic / poisonous; cannot be broken down / excreted by animals; (bio)accumulates; <i>idea that</i> , small / young chicks / animals, only need a small dose to be fatal;	<b>3</b>
2(b)(iii)	<i>any two from:</i> high cost; uninhabited island / does not affect people; no new source of lead; problem only small scale; eventually the paint chips will disperse; disturbance might make the problem worse; AVP; e.g. bigger problems to tackle first / remote location / difficult or time consuming to get to (the island);	<b>2</b>
2(c)(i)	use of linear scale; x axis fully labelled; y axis fully labelled (must be average leaf area / cm <sup>2</sup> ); correct plots;	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(c)(ii)	leaf area decreases with increasing mass of lead nitrate; decrease not linear / figures used to illustrate this;	<b>2</b>
2(c)(iii)	<i>instruction 3</i> : number / mass / size, of seeds <b>or</b> type / species, of bean stated; <i>instruction 4</i> : conditions described, e.g. specified temperature / hours of light / light intensity / soil mixture / pH / CO <sub>2</sub> ; <i>instruction 5</i> : volume of water used / frequency of watering;	<b>3</b>
2(c)(iv)	<i>any two from</i> : try experiment on another type / species, of bean / plant; grow to see change in, crop yield / height / (bio)mass / dry mass / number of leaves / flowers / seeds / fruits produced; use of other masses / concentrations, of lead nitrate; state a specific condition for the experiment, e.g. waterlogged; AVP, e.g. change in, respiration / photosynthesis rate;	<b>2</b>
2(d)	<i>any three from</i> : it is toxic to organisms / lead can poison / kill, plants and animals; lead absorbed into soils; enters groundwater; enters, food chains / food web; bioaccumulates; lead does not break down / lead pollution lasts a long time; damage to development of children / brain damage; needs to be controlled due to increased transport; AVP, e.g. adults get high blood pressure / kidney damage when exposed / to keep people healthy;	<b>3</b>