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**ENVIRONMENTAL MANAGEMENT**

**5014/22**

Paper 2

**May/June 2017**

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.

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This document consists of **7** printed pages.

Question	Answer	Marks
1(a)(i)	(900 / 25.7 =) 35;	1
1(a)(ii)	25;; <i>(if answer incorrect, allow one mark for 35 · 2 or = 70 [1])</i>	2
1(a)(iii)	<i>any one of:</i> saves buying them; to make more profit; AVP, e.g. recycling / environmental issue / small bags are scarce / expensive to buy;	1
1(a)(iv)	<i>any two of:</i> sand stolen; sand needs to be guarded at night; danger to life; AVP;	2
1(b)	<i>any two of:</i> vegetables supply; vitamins or any named vitamin; minerals or any named mineral; roughage / fibre; essential calories / supplies carbohydrate or protein or fat; prevent malnutrition; balanced diet;	2

Question	Answer	Marks
2(a)(i)	<b>(A)</b> anemometer; <b>(B)</b> rain gauge;	<b>2</b>
2(a)(ii)	thermometer / sunshine recorder / barometer / wind vane;	<b>1</b>
2(a)(iii)	<i>any two of:</i> grass surface; flat / stable ground; clear ground / away from trees or buildings / eq;	<b>2</b>
2(a)(iv)	7;	<b>1</b>
2(a)(v)	orientation and linear scale; x-axis fully labelled; y-axis fully labelled; all plots correct;	<b>4</b>
2(a)(vi)	April OR May OR June to September OR October;	<b>1</b>
2(a)(vii)	<i>any two of:</i> cheap or easy to construct; does not use too much labour / can be built by local people or farmers; more water bodies to feed nearby fields / eq; less relocation of people; <i>idea of</i> less flooding; AVP, e.g. easier to irrigate crops / greater access to water (to grow crops) / more sustainable / easier to repair / less pollutants likely to accumulate;;	<b>2</b>
2(a)(viii)	<i>any one of:</i> warm enough for plant growth; only a short dry season / eq;	<b>1</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(b)(i)	(solar / heat) energy absorbed at the surface / eq;	<b>1</b>
2(b)(ii)	0.0–0.5 m / 0–50 cm;	<b>1</b>
2(b)(iii)	(reversed shape due to) radiative or longwave cooling / cools most from the surface / it's the surface where the longwave radiation comes from / ORA / eq;	<b>1</b>
2(b)(iv)	<i>any three of:</i> reference to photosynthesis; further detail related to photosynthesis, e.g. optimal temperature for photosynthesis / photosynthetic rate increases / eq; reference to enzymes; further detail related to enzymes, e.g. discusses optimal temperature for enzymes; faster growth possible during day or when warm; some growth at night or cell elongation;	<b>3</b>
2(c)(i)	<i>after first year of cultivation</i> (rapid) drop from centre to edge of garden or from <b>P</b> to <b>T</b> ;  <i>after three years of cultivation</i> same availability across garden / eq;	<b>2</b>
2(c)(ii)	<i>any two of:</i> more people / population increases; more food needed; no more land (can be cultivated); AVP;	<b>2</b>
2(c)(iii)	<i>any two of:</i> not enough or loss of, nutrients / nitrates or other named minerals / eq; reference to damaging soil structure / soil degradation; poor plant growth; plant prone to disease;	<b>2</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(d)(i)	table drawn; suitable headings; minimum of 4 cells to collect data;	<b>3</b>
2(d)(ii)	<i>any three of:</i> not all paths surveyed; only for, 3 hours / limited time; only, some / two days a week; do not know quantity or mass or weight of wood / only people counted; AVP;	<b>3</b>
2(d)(iii)	<i>any three of:</i> use more people to do the survey / eq; survey all or more paths; more days; more hours / more times, a day; weigh wood / other measurement; AVP;	<b>3</b>
2(e)	<i>any two of:</i> being burnt (by the fire); being scalding (by the contents); damage to lungs / respiratory or breathing difficulties / named lung condition / eq; damage to eyes; toxic or poisonous gases / carbon monoxide; food poisoning / undercooked food / named illness;	<b>2</b>

Question	Answer	Marks								
2(f)(i)	<p>6 correct [3] 4 to 5 correct [2] 2 to 3 correct [1]</p> <table border="1" data-bbox="775 352 1453 555"> <thead> <tr> <th data-bbox="775 352 1120 400"><i>open fire</i></th> <th data-bbox="1120 352 1453 400"><i>new type of stove</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="775 400 1120 448">5.75 (allow 5.5 to 6.0)</td> <td data-bbox="1120 400 1453 448">3.75 (allow 3.5 to 4.0)</td> </tr> <tr> <td data-bbox="775 448 1120 496">15</td> <td data-bbox="1120 448 1453 496">10</td> </tr> <tr> <td data-bbox="775 496 1120 544">5</td> <td data-bbox="1120 496 1453 544">13</td> </tr> </tbody> </table> <p>∴∴∴</p>	<i>open fire</i>	<i>new type of stove</i>	5.75 (allow 5.5 to 6.0)	3.75 (allow 3.5 to 4.0)	15	10	5	13	<b>3</b>
<i>open fire</i>	<i>new type of stove</i>									
5.75 (allow 5.5 to 6.0)	3.75 (allow 3.5 to 4.0)									
15	10									
5	13									
2(f)(ii)	256;	<b>1</b>								
2(f)(iii)	<p><i>any two of:</i> same volume of water; same quantity or mass of hay; same quantity or mass of beans; same size of box; same size pot; type or species of wood; AVP;</p>	<b>2</b>								
2(f)(iv)	<p>14 / 14.1 / 14.09;;</p> <p><i>(if answer incorrect, allow one mark for correct working or 42, e.g. 298-256 = 42 [1])</i></p>	<b>2</b>								
2(g)(i)	<p><i>any three of:</i> less wood used / wood saved; fewer trees cut down; trees can be replanted; wood is a renewable resource / eq; more food can be cooked (to supply an increase in population); less carbon dioxide emissions / reduced impact on climate / it's carbon neutral; save time for cooking or gathering wood / cooks faster; AVP, e.g. appropriate (sustainable) technology;</p>	<b>3</b>								

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(g)(ii)	<i>any two of:</i> (limited) supply <b>and</b> (high) demand idea / ORA; (more) transport costs; AVP;	<b>2</b>
2(g)(iii)	<i>any two of:</i> not possible to cook on electricity due to cost; power cuts; supply of other fuel is unreliable; they know how to do it; reduce (running) costs / other fuel is more expensive; cools more slowly / keeps food hot for longer / cooks faster; safe to use;	<b>2</b>