Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT **5014/22**

Paper 2 Management in Context **October/November 2019**

MARK SCHEME

Maximum Mark: 80

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.

Cambridge International is publishing the mark schemes for the October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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)(i)	15.36 million;	1
1(a)(ii)	*any two from:* the environment will still be damaged; tourism cannot carry on for the, future / next generation; only a small number of tourists visit rural areas; most money spent before they arrive / local people will not get much money; example of this expenditure, e.g. paying for, hotel / fight; local people do not have much to sell; few tourists stay with local people / tourists stay in hotels; AVP, e.g. government not investing in rural areas;	2
1(a)(iii)	*any three from:* transport; hotels / construction / buildings; restaurants; (potable) water supply; food; toilets connected to sewage treatment; local guides; energy / electricity; named infrastructure, e.g. communication; medical; banking; AVP, e.g. entertainment or activities;	3
1(a)(iv)	*any two from:* noise pollution; air pollution; damage to, plants / animals / habitat / deforestation; damage from increase in, building / roads / hotels / restaurants; water pollution; water scarcity; more, solid waste / litter, disposal problems;	2
1(b)(i)	(59 ÷ 101 × 100 =) 58.4 ;; (*if answer incorrect allow one mark for,* (101 – 42 =) 59 [1]);	2

Question	Answer	Marks
1(b)(ii)	(the natural environment) where an organism lives;	1
1(b)(iii)	*any two from:* human population expands; so land cleared for, farming / development / food production; wood used for, sale / building / fuel / timber; economies expanding / for export / to raise money (by selling wood); AVP, e.g. illegal logging;	2
1(b)(iv)	*any four from:* soil erosion; soil, quality / fertility / drainage / aeration / texture / nutrients, reduced; so less interception / more (surface) run-off / less infiltration / no leaves to hold water; no living roots to bind the soil; (surface) soil washed away / soil not protected from (heavy) rainfall; (surface) soil blown away; reference to leaching; reduced organic matter;	4
1(b)(v)	*(because) primary consumers:* eat plants / producers; *(and) secondary consumers:* eat, insects / animals / primary consumers;	2
1(c)(i)	*any two from:* to determine / monitor, population or numbers; to find out if food chains / food webs, are changing; to measure the influence of humans in the area; to monitor, new / invasive species or named example;	2
1(c)(ii)	*any three from:* contour ploughing; trickle-drip irrigation / rainwater harvesting; farm organically / do not use, pesticides or fertilisers or insecticides / use biological control; reference to low input low output systems, e.g. reducing yield / stocking density / extensive / pastoral; use plants adapted to local environment; use animals adapted to local environment;	3

Question	Answer	Marks
1(d)(i)	both axes fully labelled and units; sensible linear scale and correct orientation; all plots correct ;; *6–7 plots correct [2]* *4–5 plots correct [1]*	**4**
1(d)(ii)	*allow answer in the range* 50–60 (thousand);	**1**
1(d)(iii)	*any two from:* less fuel / energy, needed; less time spent, collecting fuel / cooking; more time spent on other activities; releases less smoke / release less particulates / safer / more healthy; helps reduce impact on their local environment / stop or reduce deforestation;	**2**
1(e)(i)	it photosynthesises;	**1**
1(e)(ii)	*any six from:* use a transect; tape laid out at right angles / known angle on a known compass bearing (to path); quadrat placed at a stated regular interval or random, e.g. every 5 m; systematic / random (sampling); orchid identified (using book); count number of orchids in quadrat / count orchids along transect; on same day; record in table / example table for results; repeat in two other locations / all three locations sampled; repeat method over time, e.g. every month; calculate average number of plants;	**6**

Question	Answer	Marks
2(a)(i)	surface mining / open-pit / opencast / open-cut;	1

2(a)(ii)	*any two from:*
	more efficient / fast(er extraction);
	so cheap(er) to do;
	less dangerous;
		2

2(a)(iii)	*any two from:* magma / molten rock (from mantle); magma / molten rock, moves into the crust / pushes the crust up; (magma / molten rock) cools; (magma / molten rock) solidifies / turns to rock; slow cooling gives large crystals / fast cooling gives small crystals;	2
2(a)(iv)	*any one from:* to reduce (transport) costs / make more profit; to reduce, mass / volume to transport; increase the value of the ore;	1
2(a)(v)	*any three from:* loss of vegetation / deforestation / land clearance; loss of habitat (of many species); reduction of biodiversity; organisms, move away / migrate; water / visual / noise / air, pollution ;;	3
2(a)(vi)	*any two from:* more jobs; local infrastructure, amenities, improved; more, tax revenue for government / exports / improves economy; cost of control of pollution; cost of control of waste; loss of, farmland / agriculture; cost of restoration;	2

Question	Answer	Marks
2(b)(i)	(1000 ÷ 3000 × 100 =) 33(.3) ;; (*if answer incorrect allow one mark for,* 3000 – 2000 or 1000 [1]);	**2**
2(b)(ii)	*any two from:* supply increased; new deposits found; cost (of, extraction / processing) decreased; demand decreased; less steel needed / more recycled;	**2**
2(b)(iii)	*any three from:* recycle / reuse; reprocess old mine waste; increase efficiency of the extraction / new technologies for extraction; increase efficiency of the use, e.g. use less chromite in steel;	**3**
2(c)(i)	*any two from:* high rainfall (in most months); annual rainfall 3485 mm / average monthly rainfall 290 mm; ground saturated; leaching / run-off / water, dissolves chemicals;	**2**
2(c)(ii)	*any three from:* organism ingests, pollutant / toxin; increase in concentration of pollutant in an organism / toxin accumulates in body; organisms absorb contaminants directly from the water / bioconcentration; pollutant not excreted / ingestion rate more than metabolism or excretion rate;	**3**
2(d)(i)	*any one from:* large fish have acquired too much toxic material / bioaccumulation; overfishing; predator; AVP, e.g. disease / food chain disrupted;	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(d)(ii)</td><td>any two from:
large fish have decreased in numbers / overfishing (of large fish);
fewer predators (for small fish) / fewer large fish left to feed on small fish;
so small fish numbers increase / more small fish;</td><td>2</td></tr>
<tr><td>2(d)(iii)</td><td>any three from yes or any three from no:

no:
as the fishermen will catch too many fish;
fish can’t breed / less reproduction;
so fish numbers cannot increase / fish numbers decrease;
bioaccumulation / idea of contaminated water, (so fish will die);
so food chain / food webs, collapse / disturbed;

Or

yes:
if pollution level not too high;
and small fish caught at the same rate as they breed / not overfished;
so fish population does not collapse;
AVP, e.g. lake ecosystem remains stable;</td><td>3</td></tr>
<tr><td>2(e)</td><td>any one from:
as a, biomass / fuel;
as fertiliser;
fodder for animals;
AVP, e.g. used to make, paper / rope / baskets;</td><td>1</td></tr>
<tr><td>2(f)(i)</td><td>table completed correctly,

<table><tr><td>10</td><td>13</td><td>17</td><td>7</td><td>5</td><td>3</td></tr></table>;</td><td>1</td></tr>
<tr><td>2(f)(ii)</td><td>as a control / to compare with the other samples / as a standard;</td><td>1</td></tr>
</table>

Question	Answer	Marks
2(f)(iii)	*any two from:* volume of water; pH; temperature; light (intensity); AVP, e.g. CO_2 or O_2 levels;	**2**
2(f)(iv)	*any two from:* increase in number up to, 0.75 ppm / pot **C**; decrease after 0.75 / pot **C**, or decrease from 1.0 ppm / pot **D**; increase in number less than control at highest concentration(s) / number of plants goes below control / below increase of 10;	**2**
2(g)	lowest (increase in) number of plants; only increased by 2 plants;	**2**
2(h)(i)	*any two from:* hot climate; warm every month; range of temperature (approximately) 21–27 °C or 6 °C; so energy available to evaporate water; and plenty of water to evaporate / high rainfall / rains every month;	**2**
2(h)(ii)	October **AND** lowest precipitation month; March **AND** highest precipitation month;	**2**