Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **October/November 2022**

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 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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.

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Science–Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<u>'List rule' guidance</u> For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non–contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Question	Answer	Marks
1(a)(i)	4.2 (%) ;	**1**
1(a)(ii)	40.4 × 0.0033 / 0.13332 million / 133 320; 40.5(3332) million / 40 533 320;	**2**
1(a)(iii)	*any three from:* fewer people to work the land; increased rural to urban migration / urban pull factor; less land available for agriculture / growing crop / grazing livestock / farming; food shortages / reduction in, food supply / production of food; reduced profits for farmers / government; increased run off / more impermeable land / soil compaction; increased deforestation; leads to soil erosion / stated effect of deforestation e.g. flooding;	**3**
1(a)(iv)	*any three from:* basic human need / needed for stated human example e.g. cleaning / cooking; reduces disease; named disease; reduces, number of days workers cannot work / productivity; reduces poverty / money not spent on medicines or health care; helps LEDCs become MEDCs / idea of water rich and water poor countries becoming equal; reduces conflict;	**3**
1(b)(i)	(approximately) equal numbers of males and females; more females, live longer OR at older age / from age 60–70 / percentage of males decreases after 60–64 / higher life expectancy for females; relevant quoted comparative data for a single bar e.g. more males in 40–49 / both increase 15–9 to 45–49 / both decrease 45–49 to 95–99;	**2**
1(b)(ii)	*wide middle*: high number of working people / high number of the economically active / higher birth rate **in past**; *narrow base*: smaller number of young people / smaller proportion of young people / low birth rate / less people born each year;	**2**

Question	Answer	Marks
1(b)(iii)	*any two from:* increases number of, children born / young dependents / increases birth rate; population increases / overpopulation / **in long term** larger working population; increases number of woman who die (in child birth)	**2**

Question	Answer	Marks
2(a)(i)	*any three from:* low(er) precipitation (June to August) / July has lowest rainfall; water needed for photosynthesis / to produce glucose; increased risk of drought / soil dries out / poor soil structure / soil erosion;	**3**
2(a)(ii)	121;	**1**
2(a)(iii)	*any one from:* to be representative; may not get (much) precipitation on one day; summarises a large amount of data; idea that precipitation varies;	**1**
2(a)(iv)	*any one from:* temperature; (sun)light; wind speed; rainfall / (availability of) water; pests; disease;	**1**

Question	Answer	Marks
2(b)(i)	2;	**1**
2(b)(ii)	(concentration of), nitrate high / phosphate low;	**1**
2(b)(iii)	*any one from:* fertiliser has killed the grass; incorrect, application / dilution of the fertiliser; not enough fertiliser added; excess or overuse of fertiliser; AVP related to application of fertiliser;	**1**
2(b)(iv)	*cultivation:* hard or difficult or not easy / low or poor organic content / less nutrient rich; *drainage:* poor / low / slow / bad / difficult / stays waterlogged; *air content:* low / poor;	**3**
2(c)	*any three from:* constant / slow / steady, flow of water / water continuous; soil does not dry out; idea of water provided **close** to roots or plants; minimises water, loss / evaporation; less water used / water, is conserved / not wasted; prevents, overirrigation / waterlogging / saturation; does not require a lot of workers / automated / mechanisation;	**3**

Question	Answer	Marks
2(d)	*any two from:* (deposition of) silt; increases fertility or nutrient content of soil; increases, agricultural production / yield; recharges ground water supplies; kills pests (by flooding fields); restores wetlands; AVP	**2**

Question	Answer	Marks
3(a)(i)	*cannot be built because:* (scale is)1 km = value within range 0.35 to 0.40 (cm) OR (in cm **X** to nearest sand dune) = value within range 0.7 to 0.8 (cm) (in km **X** to nearest sand dune) = value within range 1.75 to 2 (km); OR (in cm **X** to neared sand dune) = value 1.2 to 1.6 (cm)	**2**
3(a)(ii)	*suitable **systematic** method described:* e.g. every nth person or house selected;	**1**

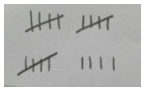
Question	Answer	Marks
3(a)(iii)	*any two from:* do not ask about the factory; biased / leading questions / only focus on positives or advantages; vague (due to use of, better / more); questions, focus on only money / very similar; closed questions / yes or no answers only / only tick box answers;	**2**
3(a)(iv)	*any two from:* risk to health; how pollution will be controlled / risk of named pollution, e.g. noise / air / water / soil; how the site of the factory will be restored after the factory is closed; how waste will be dealt with; AVP how the factory might affect the local environment, e.g. loss of, farmland / biodiversity / habitat / use of natural resources / toxicity of products / carbon footprint / how energy will be obtained ;;	**2**
3(b)	*any three from:* *at location **Q*** less salty / gets (covered with) less (sea)water / further from sea / less flooding; (sand) holds more water; fewer people have walked on the sand dune / less trampled; plants are more salt–tolerant; more sheltered (from wind/rain/weather) / less exposed / less windy; land more fertile / more organic matter;	**3**
3(c)	*any two from:* increased, tourism / ecotourism; economic benefit / employment opportunities, e.g. tour guides, restaurants / increased income; area of natural beauty to enjoy; AVP;	**2**

Question	Answer	Marks
4(a)	*any one reason for more production than consumption from:* to meet demand; surges in demand; ensure energy security; to export electricity; to prevent, load shedding / power cuts / power outages ;	**1**
4(b)(i)	sectors in clockwise rank order; largest sector starting at ‘noon’; correct plotting ± 4°; key competed AND matches sector shading;	**4**

Question	Answer	Marks
4(b)(ii)	*advantages of solar energy:* renewable; reduces use or reliance, on fossil fuels; does not emit CO_2 (at point of use) / no carbon emissions / low carbon footprint; so does not contribute to climate change / global warming / (enhanced) greenhouse effect; does not produce acid rain; low, maintenance / operating costs; no, water / noise pollution; energy produced can be stored (in batteries) *disadvantages;* visual pollution; technology not available to every country / lack of, expertise or skilled workers; idea of weather or sun dependent / not reliable; (so) additional source of power needed; greenhouse gases / SF_6 used during production of solar panels or electrical components; idea of toxic nature of batteries or cells (due to leakage / disposal) installation / connection to grid / panels / batteries are expensive; can take up large areas of land;	**4**
4(c)(i)	2.2 (MW);	**1**
4(c)(ii)	*any three from:* no transport costs; does not use existing resources or named resource e.g. fossil fuel / resources remain for future generations; waste oil, does not need to be disposed of / is not burned / does not go to landfill / waste oil is recycled or reused; stated pollution effect (due to its disposal): e.g. does not cause water / soil / air, pollution / acid rain; produces electricity / heat **AND** this can be used by restaurant;	**3**

Question	Answer	Marks
4(d)(i)	millions of years ago; (remains of small) animals / plants / organisms AND deposited on sea floor; covered with sand / mud / sediment (to form rock); heat **AND** pressure (converted to crude oil);	**4**
4(d)(ii)	sulfur dioxide;	**1**
4(d)(iii)	*any two from:* wind blows the gas; no (international) boundaries in atmosphere AVP (gas) forms acid rain;	**2**

Question	Answer	Marks
5(a)	*any two from:* timber extraction / logging; farming; infrastructure e.g. roads / hospitals; urbanisation / homes / industry / construction (industry); rock / mineral extraction / mining; fuel;	**2**
5(b)(i)	transect line drawn, horizontal / east–west / perpendicular (to power lines); 10 m long using scale; 10 equal spaced sampling sites shown **AND** Key symbol **X** used;	**3**

Question	Answer	Marks
5(b)(ii)	 ;  ;	**2**
5(b)(iii)	11.8; 12;	**2**
5(b)(iv)	*any one from:* identify anomalous results / confirm the results; to get representative data;	**1**
5(b)(v)	animals, move / may not touch the line / difficult to count / AVP;	**1**
5(b)(vi)	*any one from:* may harm animals; large animals will not be captured; will only capture certain species; can be eaten by predators;	**1**

Question	Answer	Marks
5(c)(i)	*any one strategy and max two explanation that match the strategy:* reserves / protected areas / patrols; no hunting / existing animals are not killed; no food shortages / prey protected / no competition (for resources); animals monitored / can be medically treated; enables breeding; reduces habitat loss; captive breeding / zoos; reduces risk of disease / enables vaccination; no risk predation; no hunting; provides medical care; food provided / no competition (for resources); greater / maintains / controls, genetic diversity; wildlife corridors; enables safe passage between populations; allows, breeding (pairs to meet) / young to be born; reduces contact with humans; greater / maintains, genetic diversity; AVP for explanations;	**3**
5(c)(ii)	*any one from:* idea of: to prevent, illegal smuggling / hunting / trading in animal parts; populations, can travel between countries / are in two countries; provide breeding opportunities between different regions; increase genetic diversity; enforcement / laws / legislation; monitoring; AVP;	**1**