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CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **February/March 2024**

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.

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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 descriptions 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.

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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.

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.

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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.

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Question	Answer	Marks
1(a)(i)	*any three from:* MP1 desert **AND** in the north; MP2 pastoral / grassland / farms **AND** most of the country; MP3 intensive agriculture **AND** in S / near S coast; MP4 intensive agriculture **AND** Mogadishu / capital; MP5 forest **AND** in north;	**3**
1(a)(ii)	*any two from:* MP1 more rain / cooler ; MP2 available workers ; MP3 small distance to transport crops / need large supply food ; MP4 ease of export or transport; MP5 irrigation / water ; AVP soil fertile in that area / ora	**2**
1(a)(iii)	(agriculture) for profit / making money / not for personal food production ;	**1**
1(b)(i)	MP1 maize, *Spodoptera* or moth, lizard MP2 arrows in correct direction ; correct answer: maize → *Spodoptera* or moth → lizard	**2**
1(b)(ii)	(organism that) eats, producers / plants ;	**1**

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Question	Answer	Marks
1(b)(iii)	*any three from:* *max 2 from each benefits:* MP1 crop yield, increases or maintained / less plants damaged; MP2 does not require, insecticides / pesticides / herbicides ; MP3 economic benefit to farmer; MP4 no water pollution / no leaching; MP5 less risk of, pest resurgence / moths becoming resistant to fungus *max 2 from each limitations:* MP6 fungus may kill other, moths / non-target species / pollinators ; MP7 disrupt food chain; MP8 not as effective as, insecticides / pesticides / herbicides or fungus may not survive;	**3**
1(b)(iv)	*any four from:* MP1 selective breeding / artificial selection ; MP2 collect seeds from the resistant maize ; MP3 grow the resistant maize ; MP4 repeat over many generations of maize ;	**4**

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Question	Answer	Marks
1(c)(i)	*max [4]:* *one from MP1 uses random sampling* grid the field / use GPS coordinates ; use a stated method to randomly choose quadrat sites e.g. random number generator ; *one from MP2 uses a quadrat* count the number of moths in the quadrat ; *one from MP3 records the data collected* use of table / tally system ; *one from MP4 obtains an estimate* number of moths in a quadrat by area of field ;	**4**
1(c)(ii)	*any two from moths:* MP1 fly or move ; MP2 could be counted more than once ; MP3 camouflaged / difficult to identify or see ; MP4 hide during the day / only be active at night / nocturnal ; MP5 only be present certain times of year / may migrate ;	**2**
1(c)(iii)	net / pitfall trap ;	**1**

Question	Answer	Marks
2(a)(i)	*any two comparative from:* MP1 USA fluctuates less / ora ; MP2 USA lower overall / ora ; MP3 both go down / ora ; MP4 USA decreases less / slower rate / ora ; MP5 comparative data quote / trend e.g. Somalia decreases by 2 between 1980 and 2020 whereas USA, decreases by 0.1 / stays the same ;	**2**
2(a)(ii)	answer with range 1996–1998 ;	**1**

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Question	Answer	Marks
2(a)(iii)	*any three from:* MP1 availability of contraception / family planning ; MP2 education ; MP3 opportunities women ; MP4 health care / lower mortality ; MP5 antinatalist policies ; AVP	**3**
2(b)	*any four from (max 3 from each):* *benefits:* MP1 provides food or nutrients ; MP2 easy to, administer / monitor ; MP3 provision of **free** food / reference to Somalia being a LEDC ; *limitations:* MP4 not all children attend school ; MP5 doesn't help individuals that are not school age ; MP6 relies on, charities / donations / expensive ; MP7 idea of won't solve cause of malnutrition / short term solution ; MP8 AVP ;	**4**
2(c)(i)	do you live in a rural or urban area / what is your address ;	**1**
2(c)(ii)	*any two from:* MP1 sample (men and) women / families ; MP2 sample equal numbers of women (as men) ; MP3 randomly select the sample ; MP4 use questions with yes/no answers / multiple choice answers ; MP5 explain how people should answer / give instructions ; MP6 ask more questions in the questionnaire ; MP7 idea of sample **equal** numbers from rural and urban ;	**2**
2(d)(i)	groundwater ;	**1**

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Question	Answer	Marks
2(d)(ii)	*any two from:* MP1 irrigation / crops / agricultural ; MP2 livestock farming ; MP3 industrial use ; MP4 domestic / people use ; MP5 construction of a dam (upstream) ; AVP;;	**2**
2(d)(iii)	*any two from:* MP1 only small volumes can be collected / only limited amount ; MP2 well will, dry up quickly / collapse quickly ; MP3 person may miss school / time consuming / labour intensive ; MP4 water may contain, bacteria / diseases / pathogen / named example ; MP5 contains soil / or is cloudy ; MP6 AVP ;	**2**
2(e)	*any two from:* MP1 removal of standing water ; MP2 covering water / oil on water ; MP3 killing larvae / use fish to control larvae / biological control ; MP4 insecticide use ; MP5 releasing sterile males ;	**2**
2(f)(i)	January ;	**1**
2(f)(ii)	April **and** May **and** June ;	**1**
2(f)(iii)	3 ;	**1**
2(f)(iv)	Jan; month with lowest precipitation ; **OR** Feb ; several consecutive months of low rainfall ;	**2**

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Question	Answer	Marks
2(f)(v)	*any two from:* MP1 monitoring ; MP2 emergency water supplies ; MP3 water conservation ; MP4 increased water supply or stated example: dams / reservoirs / wells / aquifers, water transfer / desalination / rainwater harvesting ; MP5 international aid ; MP6 grow drought resistant crops ; AVP ;;	**2**
2(g)	*any three from:* MP1 terracing ; MP2 contour ploughing ; MP3 bunds ; MP4 wind breaks ; MP5 plant trees / agro-forestry ; MP6 maintain ground cover ; MP7 add organic manure ; MP8 mixed cropping / intercropping ; MP9 crop rotation ; MP10 improved irrigation e.g. trickle drip ; AVP;	**3**

Question	Answer	Marks
3(a)(i)	deep mining / shaft mining / subsurface mining ;	**1**

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Question	Answer	Marks
3(a)(ii)	*any three from:* MP1 size of deposits ; MP2 accessibility of the deposits / depth of deposit ; MP3 **stated** environmental impact of mine: e.g., waste disposal / transport impact / habitat destruction / loss of biodiversity / ease of restoration ; MP4 stated human impact / health implications e.g. radiation risk / cancer ; MP5 cost (extraction) ; MP6 value of the uranium / profitability ; MP7 government licences ; MP8 availability of, labour / machinery ; MP9 public opposition;	**3**
3(a)(iii)	*any four from:* MP1 water pollution ; MP2 noise / visual / air / soil pollution from stated source ; MP3 fear over, radioactive sources / contamination ; MP4 village may need to be relocated ; MP5 employment opportunities ; MP6 improvement in local economy ; MP7 improvement in national economy / increased tax revenue for government ; MP8 improvement in infrastructure / healthcare / schools ; MP9 loss of recreational areas for village ; AVP ;	**4**

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Question	Answer	Marks
3(a)(iv)	*any four from:* MP1 fill the hole with stated material e.g. mine waste / rock / spoil ; MP2 cover with topsoil ; MP3 soil improvement ; MP4 stated example e.g. add fertiliser / add (treated) sewage or manure ; MP5 bioremediation ; MP6 use of bacteria / microbes ; MP7 plant grasses ; MP8 plant shrubs or trees ; MP9 safe disposal of (remaining) mining waste ; MP10 restore natural habitats / create nature reserve ;	**4**
3(b)(i)	*any three from:* MP1 no current nuclear power plant ; MP2 lack of money (to build or run or maintain nuclear power station) ; MP3 lack of expertise ; MP4 other alternatives are more available / Somalia has oil reserves ; MP5 other alternatives are cheaper ; MP6 people are opposed to nuclear energy ; MP7 (exporting uranium) makes money ; MP8 idea of issue of storage of nuclear waste ; AVP ;	**3**
3(b)(ii)	100 – 36 **or** 64 **or** 16 790 432 × 0.64 ; 10 745 876 ;	**2**
3(c)(i)	1 ;	**1**

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Question	Answer	Marks
3(c)(ii)	MP1 sectors in clockwise rank order ; MP2 largest first starting at 'noon' ; MP3 correct plotting ; MP4 key competed and matches sector shading ;	**4**
3(c)(iii)	13 ;	**1**
3(d)(i)	needs sunlight ;	**1**
3(d)(ii)	*any three from:* MP1 more access to electricity / more electricity available; MP2 reduces the costs of electricity ; MP3 reduces the dependence on fossil fuels / non-renewable resources ; MP4 reduces **air** pollution or stated example: smog / carbon emissions / climate change / global warming / no greenhouse gases ; MP5 idea that it helps raise people out of poverty ; MP6 employment opportunities, at power station / in local industries ; MP7 improved economy or stated example e.g. improved infrastructure ;	**3**

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