
ENVIRONMENTAL MANAGEMENT**0680/23**

Paper 2

October/November 2018

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 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **13** printed pages.

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)(i)	maize rice wheat ;; <i>3 correct [2]</i> <i>2 correct [1]</i>	2
1(a)(ii)	oats;	1
1(a)(iii)	<i>any two from:</i> less demand / less popular; less profitable than other crops / government subsidy removed; disaster; disease problems in crop;	2
1(a)(iv)	<i>any four from:</i> increase in demand; population increase; improvements to varieties; improvements to growing techniques; improved use of fertilisers; less waste during production; effective use of pesticides; increase in land cultivated;	4

Question	Answer	Marks
1(b)(i)	<i>nutrient content:</i> addition of fertilisers; <i>soil pH:</i> addition of limestone / acidification through named acidifying fertiliser; <i>drainage:</i> use of sand or grit / installation of land drains / drainage ditches;	3
1(b)(ii)	requirement of roots for oxygen; to allow (aerobic) respiration;	2
1(b)(iii)	<i>any two from:</i> flooding / waterlogging; compaction (by machine); trampling (by, animals / humans); poor use of irrigation / soil capping / poor cultivation system;	2
1(c)(i)	A fixation; B nitrification;	2
1(c)(ii)	feeding / eating (plants or animals);	1
1(c)(iii)	<i>any four from:</i> eutrophication (named); increase in algal bloom; death of algae; reduction in sunlight to aquatic plants; plants unable to photosynthesise; reduction in available oxygen in water due to bacterial use; death of other organisms as a result;	4

Question	Answer	Marks
1(d)(i)	grass;	1
1(d)(ii)	1(%)	1
1(d)(iii)	<i>any three from:</i> respiration; movement; maintaining body temperature; reproduction; excretion; items not consumed;	3
1(d)(iv)	<i>any three from:</i> photosynthesis (named); using chlorophyll; converts carbon dioxide; and water; into glucose (and oxygen); storage within the plant as starch / other sugars;	3

Question	Answer	Marks
1(e)(i)	<p><i>Level of response marked question:</i></p> <p>Level 3 [5–6 marks] Answers the question and provides a broad range of reasons in detail. The response will reach a conclusion. Reasons will be well justified to support their argument. Response will be logical in its argument and provide a balance of both viewpoints.</p> <p>Level 2 [3–4 marks] Some detail of appropriate reasons, explained well. Responses may be a mixture of for or against and may be one-sided in the argument.</p> <p>Level 1 [1–2 marks] Basic descriptive points with little or no reasoning. May just be a list of for and / or against.</p> <p>No response or no creditable response [0].</p> <p><i>Level of response marking indicative content:</i></p> <p>Candidates supporting the statement might cover benefits such as, it's an efficient use of land, less energy is wasted as fewer trophic levels are used, grazing land could be used to grow crops instead, and less water is wasted. Candidates are likely to state that more people could be fed and consider the reduction in global warming. Candidates in support of the statement might think a law is needed to change behaviours.</p> <p>Candidates against the statement might consider the ethical issues of restricting freedom of choice and consider that food is wasted anyway. Others reasons to be against the statement might include a reduction in the range of foods available, limiting the range of foods available outside of harvesting times and the impact on quality of life. Also, it would be harder to obtain all the essential minerals and vitamins in a meat-free diet. Some candidates might consider land difficult to grow crops on, e.g. slopes / hills and the fact that animals would cope better and would be more productive in these areas.</p> <p>Candidates might also cover ways to increase food production by using HYV or GM, and the better education of farmers regarding sustainable production.</p>	6

Question	Answer	Marks
1(e)(ii)	<i>any three from:</i> increase in demand for food / needs for growing population; need for a sufficient supply of food / more land for, crops / animals / housing / business; additional production may have economic benefit for the country / foreign exchange; need for, timber / biomass; provides local jobs; not able to enforce laws; perception there are large amounts of forest remaining;	3

Question	Answer	Marks
2(a)(i)	<i>any two from:</i> increase local employment at the mine; improved infrastructure (roads etc.); mine will support other businesses locally; accessibility of raw materials for local businesses; employment, supplying / servicing the mine;	2
2(a)(ii)	<i>any three from:</i> no more minerals to mine; no longer economic to mine; environmental pressures; safety concerns; fall in demand for mined product; financial problems for mining company; mining permit expires;	3
2(a)(iii)	located in all continents (except Antarctica) / widespread; large deposits in named, continent / country;;	2
2(a)(iv)	<i>any two from:</i> geographically difficult to reach places; politically difficult to reach places; deep reserves not detectable with current technology;	2

Question	Answer		Marks									
2(b)(i)	<p><i>any four from:</i> prices will go up due to shortage; economic power for those with supplies; unemployment; slowing of world economy; potential for, war / conflict; increase in price of other fuels;</p>		4									
2(b)(ii)	<p><i>any one from:</i> risk of significant environmental damage; harsh remote environment makes extraction difficult / no local workforce; extraction may cause political problems;</p>		1									
2(c)	<table border="1"> <thead> <tr> <th data-bbox="344 651 573 719"></th> <th data-bbox="573 651 1249 719">economic advantage</th> <th data-bbox="1249 651 1928 719">environmental advantage</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 719 573 887">fossil fuels</td> <td data-bbox="573 719 1249 887"> <p>cheaper to set up than nuclear / may be abundant locally / established technology / cheaper to decommission;</p> </td> <td data-bbox="1249 719 1928 887"> <p>no radiation risk / no radiation waste / easier to use area afterwards;</p> </td> </tr> <tr> <td data-bbox="344 887 573 1054">nuclear</td> <td data-bbox="573 887 1249 1054"> <p>fuel has a long life / small amount needed / less materials to be transported / less materials to be mined / fuel can be recycled;</p> </td> <td data-bbox="1249 887 1928 1054"> <p>does not produce greenhouse gases / environmental impact of extraction less;</p> </td> </tr> </tbody> </table>			economic advantage	environmental advantage	fossil fuels	<p>cheaper to set up than nuclear / may be abundant locally / established technology / cheaper to decommission;</p>	<p>no radiation risk / no radiation waste / easier to use area afterwards;</p>	nuclear	<p>fuel has a long life / small amount needed / less materials to be transported / less materials to be mined / fuel can be recycled;</p>	<p>does not produce greenhouse gases / environmental impact of extraction less;</p>	4
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2(d)(i)	<p><i>any two from:</i> taller chimney; put gasses higher into atmosphere for dispersal; less likely to be trapped by surrounding vegetation; taller chimney less sheltered by hills / more exposed to wind (to aid dispersal); less likely for emissions to be trapped in a temperature inversion;</p>	2
2(d)(ii)	<p><i>one mark for each strategy and one mark for each related explanation (max four):</i></p> <p>use of 'clean' coal; reduces emissions of, sulphur / SO₂;</p> <p>ensure coal burnt efficiently; reduces volume of particulates;</p> <p>use of scrubbers in chimney; reduces volume of SO₂ emitted;</p> <p>reforestation; to counteract carbon dioxide emitted;</p> <p>spraying chimney smoke with water; dissolve soluble gasses / collect particulates;</p>	4

Question	Answer	Marks
2(e)(i)	<p>zone J: power generation is constant / 2000 kW (at increasing wind speeds); turbine gears prevent further acceleration / maximum output from the turbine;</p> <p>zone K: no electricity generation (despite high winds); turbine disengaged / switched off to prevent damage;</p>	4
2(e)(ii)	<p>any two from: maximum speed of 10 m / s means only reaching 1250 kW; not working at, maximum capacity / maximum effectiveness; lower speeds mean less generation; wind speeds of less than 3 m / s does not generate electricity; may be times when little or no electricity generated;</p>	2
2(e)(iii)	<p>less shelter from forest; higher attitude tends to be greater wind speed;</p>	2
2(e)(iv)	<p>any two from: wave power; hydroelectric power / HEP; solar; biomass; tidal; geothermal;</p>	2

Question	Answer	Marks
2(f)	<p><i>Level of response marked question:</i></p> <p>Level 3 [5–6 marks] Answers the question and provides broad range of examples to justify their response covering a range of issues. Response will reach a logical conclusion and provide a balance of both viewpoints.</p> <p>Level 2 [3–4 marks] Some detail of appropriate reasons, explained well. Responses use some examples to justify although the response may be one-sided.</p> <p>Level 1 [1–2 marks] Basic descriptive points with little or no explanation or justification. May just be a list of for and / or against.</p> <p>No response or no creditable response [0].</p> <p><i>Level of response marking indicative content:</i> Some candidates will state vegetational succession is cheaper and requires fewer inputs. They may also agree it is as effective for reasons such as, local organisms can recolonise the area therefore local genetic mix is maintained whereas replanting will bring in a different gene pool, the landscape will evolve naturally rather than the artificial design by humans and this natural regeneration can be observed.</p> <p>Candidates may disagree because major damage has been done to the local area and without assistance it will take a long time, possibly centuries, to recover. Waste products need managing so as not to pollute the area (or water supply). Also, some organisms might be extinct locally. Other candidates may consider the fact that established processes for managed conservation schemes are well documented and can be applied well. Managed conservation schemes may also be developed for a different purpose providing new opportunities.</p>	6