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Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 **May/June 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.

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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.

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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.

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Question	Answer	Marks
1(a)(i)	*spaces from top to bottom:* (output) evaporation (input) precipitation surface storage groundwater storage ;;; *4 correct [3]* *2-3 correct [2]* *1 correct [1]*	**3**
1(a)(ii)	*interception:* refers to precipitation that does not reach the soil, but is instead **intercepted** by the leaves and branches of plants; *infiltration:* process by which **water** on the ground surface enters the soil;	**2**
1(b)(i)	48 (mm); 16.00 to 17.00 hours, day 1;	**2**
1(b)(ii)	48 (m^3 per second); 02.00, day 2;	**2**
1(b)(iii)	*any three from:* (most) rain falls away from the river; therefore water takes time to flow; as overland flow to river; through soil; through rock (as groundwater); down the river;	**3**

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Question	Answer	Marks
1(b)(iv)	*any three from:* cost of damages to property; cost of damage to contents; loss of business for, shops / other commercial activities; disruption to transport of goods; crops destroyed; soil eroded / future crop growing not possible; damage to farm machinery; loss of tourism;	**3**
1(b)(v)	*any two from:* widening of river channel; dredging of river channel; creating dams (upstream to hold back water); planting trees to reduce water entering catchment; building, banks / levees; create canals;	**2**
1(b)(vi)	*any three from:* Malaria is a water-bred disease / transmitted by mosquitoes; (anopheles) mosquitoes lay eggs in stagnant water; more water, more mosquitoes breed; if (hatched) female mosquitoes feed from person infected with malaria; they spread disease when they feed from other humans;	**3**
1(c)(i)	taiga;	**1**
1(c)(ii)	*mean annual precipitation range:* 20–350 mm **and** *mean annual temperature range:* 8–27 °C;	**1**
1(c)(iii)	*any three from:* mean annual temperature –10 to +3 or +4 °C; mean annual precipitation 60 to 1200 mm; precipitation increases as temperature increases; very cold; low precipitation; precipitation may fall as snow;	**3**

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Question	Answer	Marks
1(c)(iv)	*any three from:* low growing plants; such as sparse grass; and shrubs (crowberry, etc.); moss / lichen; no / few, trees;	**3**
1(c)(v)	*any three from:* reduce overgrazing of livestock; less exposed soil / soil erosion; prevent cutting down of trees; develop nature reserves; regular patrols / monitoring; involve community to protect wildlife; increasing awareness / campaigns / education; legislation to protect, area / ecosystem;	**3**
1(d)(i)	2 divisions and key correct and correct shading = 2 marks ;; 1 division and key correct and correct shading = 1 mark ; 2 divisions correct, but incorrect shading = 1 mark ;	**2**
1(d)(ii)	irrigation;	**1**

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Question	Answer	Marks
1(d)(iii)	*Level of response marked question:* Level 3 [5–6 marks] Provides a thorough explanation as to how the issue might be resolved. Identifies genuine areas of competition for water and how this might be managed for different scenarios. Level 2 [3–4 marks] Both identifies competition for water and gives some explanation, possibly rather vague, of how they may be resolved, or thoroughly discusses water management to avoid conflict, but with no context or relation to actual competition for water. Level 1 [1–2 marks] Basic descriptive points with little or no reasoning. May just be a list of conflicts or measures with little or no explanation. No response or no creditable response [0]. *Level of response marking indicative content:* Better candidates will most likely discuss competing demand for sources. These might include between countries and/or regions. More likely is between end users, such as domestic, agriculture and industry and between agricultural users. The best candidates will suggest strategies to limit or share water use and developing new sources such as aquifers, creating reservoirs or desalination. Some candidates might discuss international or regional treaties / agreements. Some might include government intervention via quotas, legislation or pricing.	**6**

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Question	Answer	Marks
2(a)(i)	biofuel and waste;	**1**
2(a)(ii)	30 (million tonnes of oil equivalent);	**1**
2(a)(iii)	*any three from:* awareness of issues of fossil fuels increased; concerns about depletion of, fossil fuels / oil / coal / gas / non-renewable sources; concerns about, carbon dioxide / global warming / climate change; concerns about other pollutants leading to, acid rain / breathing difficulties; increase in demand for energy; government subsidies for green energy; technological developments in renewables / renewables become more efficient;	**3**
2(a)(iv)	*any two from:* no hot rock near surface in much of the world; high cost initially; lack of required expertise;	**2**
2(b)(i)	both bars plotted correctly for 1 mark;	**1**
2(b)(ii)	24(%);	**1**
2(b)(iii)	*any two from:* may lack other fuels (to make electricity); developed countries can afford nuclear power; long history of using nuclear power; availability of uranium / raw material; (impacted by)safety concerns;	**2**
2(b)(iv)	*for:* does not, produce carbon dioxide / cause global warming / does not emit, sulfur / nitrogen oxides / does not cause acid rain; *against:* danger of, radioactive waste / accident / process needs a lot of water that is dumped into the sea (affecting wildlife);	**2**
2(c)(i)	Australia;	**1**

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Question	Answer	Marks
2(c)(ii)	*any two from:* mostly within tropics; most in Northern hemisphere; spread through, South America / Asia; detail such as a named country;	**2**
2(c)(iii)	*any three from:* clearing vegetation; soil removed and stored; overburden removed; rock / ore, loosened by blasting; diggers load trucks;	**3**
2(c)(iv)	*any five from:* dust: use water sprays; noise: restrict hours of operation at the mine; water pollution: use of settlement ponds / control of run-off; visual pollution: landscaping of site; habitat destruction / deforestation / wildlife disturbance: tree planting / protected areas; use of technology to better define the site; government licensing the sites of mines; example of remediation / restoration after extraction completed;	**5**
2(d)(i)	*(China)* Russia Canada India UAE / United Arab Emirates ;; *4 correct [2]* *2-3 correct [1]* *1 correct [0]*	**2**
2(d)(ii)	55% circled;	**1**
2(d)(iii)	4 / Australia, China, India, Russia;	**1**
2(e)(i)	Australia / Russia / China / India;	**1**

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Question	Answer	Marks
2(e)(ii)	*all three needed for **one** mark:* Canada, Norway, Iceland;	**1**
2(e)(iii)	*any four from:* emits large amounts of carbon dioxide; which contributes to, global warming / climate change; emits sulfur dioxide; which contributes to acid rain; emits, particulates / smoke; which create smog / cause breathing difficulties; mining destroys, landscape / vegetation / habitats; transporting coal requires (large amounts) of fuel; underground mines can cause surface subsidence;	**4**
2(f)	*Level of response marked question:* Level 3 [5–6 marks] Must conclude that recycling alone cannot solve the problems, so not true or partially true. A balanced argument giving thorough reasons for the conclusion. Level 2 [3–4 marks] May agree, disagree or partially agree, but limited discussion of reasons (i.e. more than one) and other approaches. Level 1 [1–2 marks] May agree or disagree, but with only basic reasoning or one point made more thoroughly. Responses may focus on either atmospheric pollution or depletion of resources. No response or no creditable response [0]. *Level of response marking indicative content:* Recycling will certainly reduce both depletion of resources and atmospheric pollution, but is unlikely to solve the problem. Recycling usually requires transport to a recycling centre and energy for the processing. Better candidates should identify this and therefore state that it is only partially true or not true as it won't fully solve the problem. Some candidates may write about other methods to combat depletion of resources and atmospheric pollution such as, renewable energy and low waste technologies, which can gain credit.	**6**

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