Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT **5014/11**

Paper 1 **October/November 2018**

MARK SCHEME

Maximum Mark: 120

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.

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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.

Question	Answer	Marks
1(a)(i)	all three segments plotted correctly (living 3%, dead 9%, decomposing 88%) ;; (*if plotting incorrect, allow one mark for one correctly plotted segment*) correct use of key;	**3**
1(a)(ii)	earthworms / beetles / woodlouse / AVP;	**1**
1(a)(iii)	fungi / bacteria;	**1**
1(a)(iv)	*any two from:* minerals / rock particles / weathered rock; air; water;	**2**
1(b)	*any three from:* when ploughed in it adds organic matter; decomposes to add, nutrients / plant foods; improves soil structure / helps soil particles stick together; adds / retains, moisture; raises pH / reduces acidity; animals enrich soil with manure while eating the grass;	**3**

Question	Answer	Marks
2(a)(i)	it is driven by winds that move in the same direction / wind blows west / wind blows from east / blown by SE Trade winds;	**1**
2(a)(ii)	*any two from:* warmer; more cloud; wetter / higher rainfall; less / no, mist / fog;	**2**

Question	Answer	Marks
2(a)(iii)	*any three from:* upwelling of cold water brings nutrients; cold Peruvian current brings nutrients; waters are rich in nitrates; waters are rich in plankton; plankton provides abundant food supply for fish (anchovies);	**3**
2(a)(iv)	warm water has, little oxygen / few nutrients / little food supply;	**1**
2(b)	*any three from:* need to feed increasing populations; disputes over fishing grounds; fishing stocks used before are depleted; may have mineral wealth; oil / natural gas, in demand for energy; government / military, policy; difficulty of, defining / establishing / policing boundaries;	**3**

Question	Answer	Marks
3(a)(i)	75;	**1**
3(a)(ii)	lower percentage of cities with increasing levels of fine smoke particles in higher income countries / ORA; 28% (higher income countries) and 52% (lower income countries);	**2**
3(a)(iii)	get into the lungs / lung cancer / COPD / respiratory problems / heart disease / strokes / asthma;	**1**
3(b)	*any three from:* exhaust emissions from many vehicles / high traffic levels; especially diesel; frequent traffic jams; gases from power plants; gases / smoke, from industries; dust from construction sites;	**3**

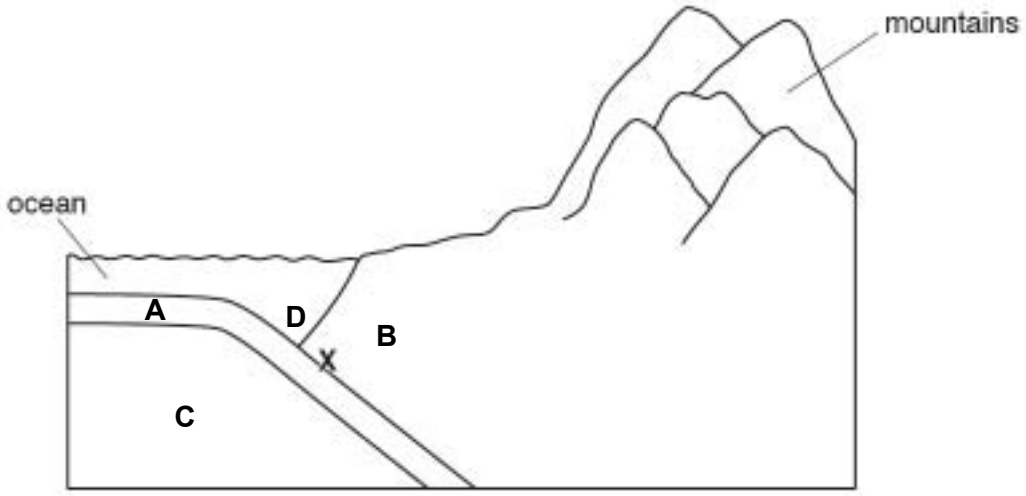
Question	Answer	Marks
3(c)	*any three from:* expense; need to gain revenue; importance of industry to the economy; high use of polluting, fossil fuels / coal / oil / wood; less environmental, awareness / education; little legislation to control atmospheric pollution; many open fires for cooking; burning of vegetation to clear for farming;	**3**

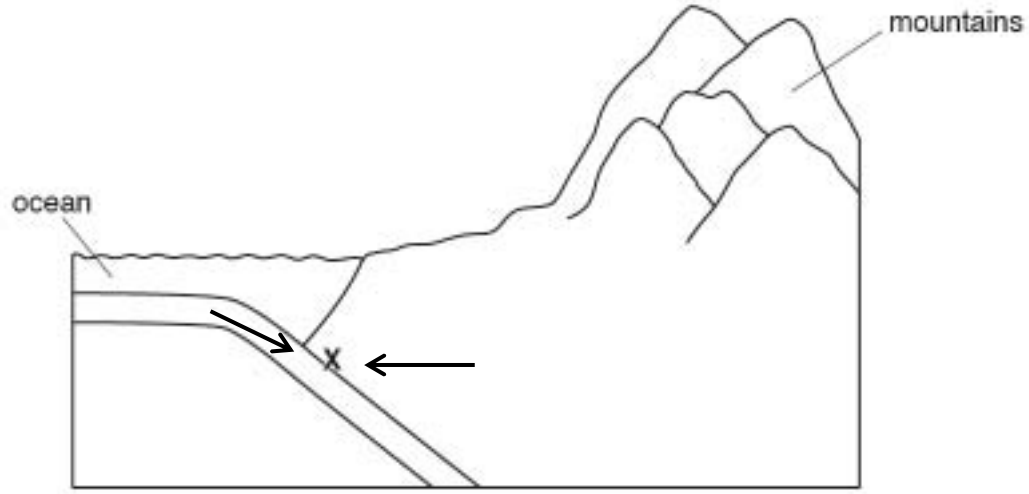
Question	Answer	Marks
4(a)(i)	**C** – *vegetational succession is being stopped*; **A** – *vegetational succession has been happening for a long time*; **B** – *vegetational succession has been happening for a shorter time*; *3 correct [2]* *1–2 correct [1]*	**2**
4(a)(ii)	pastoral;	**1**
4(b)(i)	*any three from:* different species; taller / tallest, that can grow in the climate; denser; fewer species than the stage before; reduced, ground / field layer / herbaceous plants / shrubs;	**3**
4(b)(ii)	new species are brought in (by wind / animals);	**1**

Question	Answer	Marks
4(c)	*any three from:* more varied / increased number of, habitats; animals move in; increased biodiversity; reduced soil erosion; deeper soil; (usually) more fertile soil; more moisture in the soil; more shade / cooler at lower levels; more moisture in the air;	**3**
5(a)(i)	*both benefits of tourism and negative impacts of tourism must be covered for maximum credit:* *max three from, benefits:* jobs for local people; income for local economy / foreign exchange / foreign currency; preserves rural services; increased demand for local produce or crafts; encourages conservation, of the habitats / awareness; improvement to infrastructure; *max three from, negative impacts:* litter / erosion (qualified) / fires / vandalism; more people / increased noise levels, disruption to wildlife / scares animals; traffic congestion / air pollution; local goods become expensive; shops stock products for tourists; housing prices increase; jobs are seasonal; increased sewage (to remove) / water pollution; deforestation / clearing land – qualified;	**4**

Question	Answer	Marks
5(a)(ii)	*any two from:* idea of education of tourists – qualified; encourage visitors to leave cars outside of parks; no 'idling' of car engines within parks; encourage visitors to buy local; create walkways / maintain paths (to prevent erosion); planning polices to control buildings of hotels etc.; restrict access to parks / quotas; charge visitors a fee to enter the park; ensure, facilities / attractions are spread out (to reduce concentration of tourists in an area); laws / fines – qualified; ecotourism; provide bins;	**2**
5(b)	*any four from:* (family) has always lived in the area; no (large) earthquakes in living memory / perceived threat is low; cheaper land / expensive to live elsewhere; work in the area / tourism; (confidence in country's) strategies in place for managing the impacts of earthquakes; earthquake resistant buildings; minerals / natural resources, often near plate boundaries; fertile soil; source of geothermal energy;	**4**
5(c)(i)	data correctly plotted;; *4 correct [2]* *2–3 correct [1]*	**2**
5(c)(ii)	29;	**1**
5(c)(iii)	167;	**1**

Question	Answer	Marks
5(c)(iv)	*any four from:* temperatures increase then decrease; hottest in, June, July and August / July / increase to July then decrease; maximum 23 °C / minimum –6 °C; precipitation fluctuates; wettest in June / May–September / summer; highest rainfall 60 mm / lowest 20 mm; correlation between high temperature and high precipitation; (some) precipitation falls as snow / freezing in winter;	**4**
5(c)(v)	**A** = rain / precipitation AND (rain) gauge; **B** = (wind) speed / force AND anemometer; **C** = sunshine; **D** = (wind) vane;	**4**
5(c)(vi)	*any four from:* loss of life / injury; crops / livestock, destroyed; lack of food / malnutrition / starvation; water supplies contaminated; may lead to, cholera / typhoid / water-related disease / water-borne disease; stagnant water for breeding mosquitoes; increasing risk of malaria; houses and contents, damaged / lost; homelessness / evacuation; infrastructure / transport / communication, disrupted; cost to government; businesses damaged; people out of work; loss of income; food costs increase; time / effort / cost, of restoration when floods recede;	**4**

Question	Answer	Marks
5(d)	*any two from:* it has melted; increased (emissions of), greenhouse gases / CO_2 / methane; climate change / global warming / (Earth's) temperature has increased;	**2**
5(e)(i)	*oceanic crust correctly labelled on diagram as **A**;* *continental crust correctly labelled on diagram as **B**;* *mantle correctly labelled on diagram as **C**;* *trench correctly labelled on diagram as **D**;* e.g.  	**4**
5(e)(ii)	subduction (zone);	**1**

Question	Answer	Marks
5(e)(iii)	*arrows show the direction of movement is towards each other*; e.g.  	**1**

Question	Answer	Marks
5(f)	*Level of response marked question:* Level 3 [5–6 marks] Answers will be detailed and well-rounded. The reasons given will be developed. The best answers may include appropriate examples and will present reasons to support both viewpoints. Level 2 [3–4 marks] Answers will include ideas and / or reasons that have been developed or explained. They may include a specific example but lack some essential details or breadth within the answer. Responses may focus on one viewpoint. Level 1 [1–2 marks] Answers may include a viewpoint presented in a list with little development. Alternatively the response may focus on one or two reasons. There may be repetition or comments not relevant to the question asked. No response or no creditable response [0]. *Level of response marking indicative content:* Many learners will tend to agree with the statement citing issues such as: It is a renewable energy resource and there are no ongoing fuel costs. Geothermic energy does not produce harmful polluting gases. Responses will typically identify that it is a constant source of energy or a limitless supply. More complex responses might include detail of the small land footprint compared with other power sources, and that the process is simple and reliable. Viewpoints that disagree with the statement will typically cite that: Most parts of the world do not have suitable areas where geothermal energy can be exploited or it is location specific. More detailed responses might include a reference to the high installation costs, the difficulty in transporting hot water from the source without heat loss – limiting the distance it may supply and the costs required by businesses / homes to retro-fit. Other responses might include the low public awareness. Longer term effects might include the risk that unstable ground may induce seismic activity when water is withdrawn and the unknown impact on agricultural irrigation. Other concerns could include the difficulty in drilling into the heated rocks and the difficulty in working with water at such high temperatures.	**6**

Question	Answer	Marks
6(a)(i)	bitumen;	**1**
6(a)(ii)	*any two from:* deposits deep underground; (oil sand bitumen mixture) only contains 10% bitumen; (oil sand bitumen) has to be separated from the sand before it can be used; expensive process compared to the return;	**2**
6(b)	*any three from:* formed over millions of years; (from remains of dead marine) organisms; (remains of dead organisms) fell to bottom of sea covered in, mud / sand / sediment; mud / sand / sediment, buried by more sediment; (changed to oil as) temperature / pressure increased;	**3**
6(c)(i)	*any three from:* loss of habitat / disruption to food chains / animals might move away / extinction / reduction in biodiversity; soil erosion; increased (surface) run-off / flooding / siltation of rivers; desertification; (local) climate change / (local) reduced rainfall;	**3**
6(c)(ii)	recycling / use more parts of the tree, e.g. chipboard or laminate;	**1**

Question	Answer	Marks
6(c)(iii)	*any four from:* *sustainable forestry activities;* agro-forestry; example or description of the above; community forestry; example or description of the above; reforestation; description of the above; sustainable harvesting of hardwoods; example or description of the above; fuel wood planting; example or description of the above; *potential problem of sustainable management of forests;* world population growing fast, so more demand for timber; example of the above; more demand for, cleared land / agricultural land; example of the above;	**4**
6(d)(i)	*any four from:* damage to homes / homes destroyed / evacuated / homeless; loss of life / injury / burns; danger to health from the (chemical or particulates in) smoke / breathing difficulties / eye irritation / asthma; loss of income; power / water, supply disrupted; lack of sanitation;	**4**
6(d)(ii)	living organisms and the physical factors in an area or habitat; reference to, interaction between them;	**2**

Question	Answer	Marks
6(d)(iii)	*any five from:* (soot / particulates / smoke) reduces photosynthesis; increased carbon dioxide emissions; describes an effect of increased CO_2 / climate change or greenhouse effect; (SO_2) acid rain formation; describes an effect of acid rain / damages crops or acidifies lakes; air pollutants / ash / soot deposited, damage trees / water sources; damage to animal lungs; habitat destroyed; loss of trees / roots burnt, causing soil erosion; food chains disrupted / death of organisms / loss of biodiversity;	**5**
6(d)(iv)	*both positive and negative response must be covered for maximum credit:* *max three from, positive response:* only a few people killed / people saved; state of emergency declared / evacuation; lots of support given to fight the fires / numbers of firefighters; *max three from, negative response:* many homes destroyed or damaged; water and power outages; fires burned for a long time; fires covered a large area; some people killed;	**4**
6(e)(i)	173;	**1**
6(e)(ii)	Saudi Arabia / Venezuela;	**1**
6(e)(iii)	(168 / 173 × 100 =) 97 / 97.1;	**1**

Question	Answer	Marks
6(f)(i)	*any two from:* filling in – qualified; landscaping; example of reclamation; waste management;	**2**

Question	Answer	Marks
6(f)(ii)	*Level of response marked question:* Level 3 [5–6 marks] Answers will be detailed and well-rounded. The reasons given will be developed. The best answers may include appropriate examples and will present arguments to support both viewpoints. Level 2 [3–4 marks] Answers will include ideas and / or reasons that have been developed or explained. They may include some reasons but lack some depth or breadth within the answer. Responses may focus on one viewpoint. Level 1 [1–2 marks] Answers may include a viewpoint presented in a list with little development, may focus on one or two reasons. There may be repetition or comments not relevant to the question asked. No response or no creditable response [0]. *Level of response marking indicative content:* Reasons to allow the expansion of the mine could include justification that more jobs will be created which will bring increased income into the area and improvements to the local economy. Responses might also identify the improvements to infrastructure in the area which will be needed to serve the enlarged mine. Some responses may focus on the impact nationally, namely the availability of oil reserves and the improvement in economic growth. Some might also identify the security to energy supplies that might result. Reasons against the mine are likely to include factors such as an increase in noise pollution, atmospheric pollution and the impact on greenhouse gas emissions. More locally, there may be reference made to the impact on local rivers due to run-off, the destruction of habitats as well as the impact of increased traffic. Broader and more detailed responses might also mention the fact that mining / extraction is carbon intensive and the country should be moving towards renewable resources, and oil sands are non-renewable;	**6**