Cambridge International AS Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary Level

ENVIRONMENTAL MANAGEMENT **8291/12**

Paper 1 **October/November 2017**

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 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

Question	Answer	Marks
1(a)(i)	Similarities: trades blow towards Equator; mid-latitude circulation is westerly; similar vertical circulation patterns; air moves from high pressure to low pressure; Differences: deflection (right in northern hemisphere / left in southern hemisphere); trade winds blow in contrasting directions; westerly winds blow in contrasting directions;	**2**
1(a)(ii)	(warm) air rises at the equator; flows northwards/southwards aloft; sinks at the tropics; surface winds (trade winds) return air to the Equator;	**2**

Question	Answer	Marks
1(b)	Relief: the prevailing winds carry moisture over Andes (mountains); resulting in relief rainfall over the mountains themselves; low precipitation totals in the Atacama (desert); producing a rain shadow; Ocean currents: cold offshore ocean current produces cool air; cool air unable to pick up much moisture; which blows dry air onto the Atacama (desert); resulting in a lack of precipitation; leading to aridity along west coast;	**6**
1(c)(i)	at the surface air moves onshore (landward) by day / offshore (seaward) at night; air rises over land by day / sinks by night; air rises over the sea by night / sinks by day; air aloft moves seaward by day / landward by night;	**2**

Question	Answer	Marks
1(c)(ii)	Sun heats the land quicker than the sea; (as a result) the sea is cooler than the land; this leads to rising air (convection); which results in air being cooled (adiabatically); air unable to hold as much water vapour; air becomes saturated with water vapour; condensation results in formation of cloud;	**4**
1(d)	forecasts enable planning to occur; high wind speeds can be hazardous for farming; disrupt recreation, e.g. sailing; can lead to travel disruption, e.g. flying / closing exposed bridges; can lead to building and infrastructure damage; low wind speeds can limit electricity generation from wind turbines;	**4**

Question	Answer	Marks
2(a)(i)	X destructive Y constructive Z destructive	**2**
2(a)(ii)	2.92; Workings: (1.8 + 2.3 + 3.0+ 2.5 + 3.8 + 4.1); 17.5/6;	**2**
2(b)(i)	earthquake magnitude: refers to the size; quantity of energy released; using seismometers; measured on Richter scale / moment magnitude scale; earthquake frequency: refers to how often earthquakes occur; time interval between earthquakes; the likelihood of an earthquake occurring in an area;	**4**

Question	Answer	Marks
2(b)(ii)	Earthquakes on a destructive plate boundary: high magnitude; (results in maximum damage) to life and property; low frequency; results in difficulties of prediction and preparation; and can lead to complacency; potential to cause tsunami if submarine earthquake; **OR** Earthquakes on a conservative plate boundary: Mainly found under the oceans; shallow depth can be the cause of maximum damage; maximum horizontal ground displacement; leads to damage; variable frequency; leads to difficulties of prediction and preparation;	**4**

Question	Answer	Marks
2(b)(iii)	Underlying rocks: more consolidated the rock the less damage; looser soil could mix with water and cause liquefaction; increasing the amount of damage; brittle rock fractures more readily; Population density and distribution: proximity of dense population centres; increases likelihood of property damage; increased likelihood of injury or death; differences between towns and villages where construction standards may vary; search and rescue facilities may vary; Time of day: percentage of people indoors varies; could be determined by people concentrated in work places; people at home; awake or asleep affects response; volume of traffic on roads / rail; Type of housing and building materials: stronger the less damage; construction standards may vary;	**8**

Question	Answer	Marks
2(b)(iii)	provision of better construction / earthquake proof buildings ORA; urban / high rise living versus rural; density of buildings; Level of economic development: developed countries more resilient; access to search and rescue; provision of better construction / earthquake proof buildings ORA; variation in infrastructure; education;	

Question	Answer	Marks
3(a)	Dust contributes to particulate matter in the air in what appears to be a semi-arid environment. Heavy machinery will both encourage soil loss / erosion and compact the soil. Levelling the land will alter the drainage patterns which may cause destabilisation of the slopes. Loss of vegetation will leave surface vulnerable to soil erosion and mass movements. Fragile ecosystems may be damaged / destroyed. Water and air pollution. Candidates may refer to the situation once urbanisation has taken place, e.g. permeable surfaces replaced by impermeable ones.	**10**
3(b)	The question requirements are: • to show an awareness of the ways in which use of the resources will damage the natural environment • to suggest how management strategies can prevent / limit the damage • to use examples	**30**

Question	Answer	Marks
4(a)	The existence of a tropical cyclone south east of Japan. The presence / absence of cloud at different latitudes, e.g. a belt of cloud close to the Equator, clear skies (high pressure) over much of northern and central Australia. Cloudy and presumably wet conditions over South and South East Asia. Satellite imagery allows monitoring of the location, frequency and intensity of cyclones. Monitoring of ocean temperatures, currents, extent of sea ice and inland lakes / deltas and the receiving and transmitting of data from ocean weather buoys. Monitoring of extent of desert. These contribute to weather records and allow forecasters to monitor and predict climate changes in the longer term.	**10**
4(b)	The question requirements are: • to show an awareness of the ways in which carbon dioxide and methane may be contributing to global warming • to make an assessment of the extent of that contribution • to refer to examples from different parts of the world	**30**

Question	Answer	Marks
5(a)	CFCs were used in aerosols and as fridge / freezer coolants prior to 1980s. Increased concentration of chlorine in the atmosphere breaks down ozone. Ozone layer (40–50 km up in the stratosphere) absorbs UV. Harmful effects to human health: increase in skin cancers, premature ageing of the skin, eye cataracts and blindness, and suppression of immunity. Harmful effects to the natural environment: Damage to animal health, marine life (plankton), crop yields, forests, plant productivity.	**10**
5(b)	The question requirements are: • to show an awareness of the ways in human activities are responsible for polluting the atmosphere • to show an awareness of management strategies to combat atmospheric pollution • to evaluate these management strategies • to use a range of examples to support argument	**30**

Question	Answer	Marks

Section B part (a)

Level descriptors 1

8–10 marks
The response:
- contains few errors
- shows a very good understanding of the question
- shows a good use of data or the information provided, where appropriate
- provides a balanced answer

5–7 marks
The response:
- may contain some errors
- shows an adequate understanding of the question
- shows some use of data or the information provided, where appropriate
- may lack balance

1–4 marks
The response:
- may contain errors
- shows limited understanding of the question
- shows little or no use of data or the information, where appropriate
- lacks balance

Question	Answer	Marks

Section B (part b):

Level descriptors 2
Responses:

Level one, 25–30 marks
- fulfil all the requirements of the question
- contain a very good understanding of the content required
- contain a very good balance of content
- contain substantial critical and supportive evaluations
- make accurate use of relevant vocabulary

Level two, 19–24 marks
- fulfil most of the requirements of the question
- contain a good understanding of the content required
- contain a good balance of content
- contain some critical and supportive evaluations
- make good use of relevant vocabulary

Level three, 13–18 marks
- fulfil some requirements of the question
- contain some understanding of the content required
- may contain some limited balance of content
- may contain brief evaluations
- make some use of relevant vocabulary

Question	Answer	Marks
	Level four, 6–12 marks • fulfil limited requirements of the question • contain limited understanding of the content required • may contain poorly balanced of content • may not contain evaluations • make limited use of relevant vocabulary **Level five, 1–5 marks** • fulfil a few of the requirements of the question • contain a very limited understanding of the content required • are likely to be unbalanced and undeveloped • evaluative statements are likely to be missing • make no use of relevant vocabulary	