Cambridge International AS Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary Level

ENVIRONMENTAL MANAGEMENT **8291/11**

Paper 1 **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.

Cambridge International is publishing the mark schemes for the May/June 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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)	shortwave energy / energy emitted by the sun / energy received at the outer atmosphere / energy entering the earth's system;	**1**
1(a)(ii)	**X** = 23; 100 – (48 + 29) / 77 / 48 + 29;	**2**
1(a)(iii)	**Y** = 6; 48 – (25 + 17) / 42 / 25 + 17;	**2**
1(a)(iv)	incoming and outgoing / inputs and outputs; AW balance / equilibrium;	**2**
1(a)(v)	Evaporation: liquid water absorbs solar energy at surface; turns to water vapour; rises / goes into the atmosphere; condenses back to cloud and rain; releasing stored latent heat; Convection: air in contact with ground warms / heat conducted from ground to air; warm air rises / expands / becomes less dense / becomes buoyant; warm air cools by expansion; transferring heat (energy up into the atmosphere);	**3**

Question	Answer	Marks
1(a)(vi)	Absence of cloud cover: an absence of cloud cover will result in less incoming shortwave solar energy being reflected / absorbed by the atmosphere (decreased albedo); increasing the amount reaching the Earth's surface; the absence of cloud will increase the amount of outgoing longwave terrestrial energy escaping; Major volcanic eruption: volcanic activity can push aerosols / ash / particles high into the atmosphere (stratosphere); resulting in an increase in amount of incoming energy being reflected / scattered / absorbed; reducing the proportion reaching the earth's surface; natural climate forcing / drivers; local increased surface temperatures / convection; dark lava flows reducing albedo of surface; emissions of SO_2 have cooling effect;	**4**
1(b)(i)	fluctuating (below average prior to 1920); (overall) rises over time; rising in early 20th century; levelling off in mid-century; consistently rising in late 20th / early 21st century; specific reference to spike / trough years;	**2**

Question	Answer	Marks
1(b)(ii)	broad positive correlation between the two variables / as CO_2 emissions increase so do average global temperatures; CO_2 acts as a greenhouse gas / greenhouse effect; increase in (man-made) CO_2 emissions results in atmosphere absorbing / storing more heat; forcing climate warming / change; raising land and sea surface temperatures / increasing global temperatures;	**4**

Question	Answer	Marks
2(a)(i)	conservative / transform / passive;	**1**
2(a)(ii)	the Anatolian plate is moving westward / to the left (on the map); relative to the movement of the Eurasian Plate; at a rate of 2.5 cm per year;	**2**
2(a)(iii)	it is at a plate boundary; plates sliding past each other; creating friction; causes movement to be irregular; the build-up of stress / pressure; results in a sudden release / triggering earth tremors;	**3**
2(a)(iv)	a linear pattern; following the line of the plate boundary; newest to the west / oldest to the east / correct reference to dates; relationship between distance apart and time interval / they get closer together but less frequent on average;	**3**
2(a)(v)	release of stress at one point on the fault; results in increased stress immediately at the next point; past earthquakes have progressively occurred westward leading towards Istanbul; correct reference to events in the mantle;	**2**

Question	Answer	Marks
2(b)(i)	magnitude of earthquake; time of day; proximity to the city of Izmit; population density; impact of tsunami wave; building materials e.g. reinforced concrete; lack of monitoring facilities; lack of preparedness; AW	**5**

Question	Answer	Marks
2(b)(ii)	steel frame / interlocking; sway with the earth movements; moving weights on roof; reduce movement; reinforced lift shafts; allow escape / rescue; rubber shock absorbers between building and foundation; absorb the force of the tremors; deep foundations; reduce effect of surface movement; flexibility; prevents falling debris; automated window shutters; close to prevent falling glass; reinforced glass; resist breaking; AW	**4**

Question	Answer	Marks
3(a)		**10**

	people	environment
rising sea level	costly coastal defences; loss of farmland;	salinisation; coastal erosion; loss of habitat;
rising ocean heat	thermal expansion and rising sea levels as above; damage to coastal tourism;	coral damage;
declining sea ice	improved navigation;	habitat loss;
rising land temperatures	drought;	soil damage; soil erosion;
decreasing glacier and snow cover	damage to tourist industry; water availability;	habitat loss; loss of land insulation;
rising air temperature	human health problems;	increasing storm activity;
more water vapour	flooding; costly flood defence work;	increased precipitation;

Please use level descriptors 1

Question	Answer	Marks
3(b)	*The question requirements are:* *to outline a range of strategies to reduce air pollution at a global scale* *to outline a range of strategies to reduce air pollution at a local scale* *to compare local and global strategies* *to evaluate the relative success of local versus global strategies with reference to examples* **Indicative content:** Global strategies resulting from named international climate conferences and agreements should be compared with local initiatives, in particular in industrial and urban areas. Local strategies may include car sharing, catalytic converters, expansion of public transport, congestion charging, park and ride; controls on factory emissions, introduction of scrubbers. International agreements are difficult to achieve, not always adhered to and some countries won't sign or withdraw after signing, or simply ignore. Montreal – CFCs and Ozone Kyoto – Greenhouse emissions (but only developed countries) Paris – global warming and limit to temperature rise through further emission reduction Candidates are likely to describe a range of types of atmospheric pollution and the causes but they must focus on the strategies and their comparative successes. **Please use level descriptors 2**	**30**

Question	Answer	Marks
4(a)	Data suggests that the energy policy may be focused on reducing fossil fuel use while increasing renewable energy production. A steady decline in energy consumption is apparent in all sectors. Over the same period there has been a steady increase in renewable energy production, especially from geothermal and solar sources post 2015. Energy conservation may be responsible for declining consumption through more efficient use of energy e.g. industrial machinery, car engines. A reduction in the dependence on fossil fuels may be a result of concerns about climate change and global warming and the need to meet internationally agreed targets for reducing carbon emissions. **Please use level descriptors 1**	**10**
4(b)	*The question requirements are:* *to state the arguments for eliminating fossil fuels as energy sources in the long term* *to state the arguments why this may be too challenging in the short term* *to come to a balanced conclusion* **Indicative content:** Candidates are likely to compare the environmental imperative to reduce fossil fuel use with the economic and pragmatic arguments for its continued use. Answers may reflect on the emerging economies and the high energy value and low-cost benefits of fossil fuels before describing technological developments to minimise impact of fossil fuels in future, the nuclear debate, the opportunities and challenges for renewable or alternative energy sources. **Please use level descriptors 2**	**30**

Question	Answer	Marks
5(a)	The highest mortality rates are to be found in N. America, N.W. and E. Europe, N. Asia and the southern half of S America. This may be explained by the fact that these are largely industrialised countries, energy producers, countries relying on solid fuel energy sources producing particulates injurious to human health. Population density and affluence is also likely to be a factor particularly car ownership. The quality of cars owned will also contribute. Newly industrialised countries may or may not prioritise pollution controls. Countries with low mortality rates may have less developed economies or industrial sectors and less vehicle transport. **Please use level descriptors 1**	**10**
5(b)	*The question requirements are:* *to explain the links between vehicle traffic and air pollution* *to explain a range of strategies to reduce this impact* *to conclude as to the extent the assertion is true* **Indicative content:** Candidates are expected to show a clear knowledge of the links between traffic and both types of pollution and exemplify e.g. ground level ozone, smog and noise. Diesel particulates may be considered. An understanding is expected that there are other sources of pollution e.g. industry and power stations. Good answers will clearly conclude as to the extent the statement is correct and can suggest that improving the efficiency of vehicles (candidates are likely to refer to catalytic converters, car sharing and improved public transport) and the move to electric cars and cars that switch off in queues etc. as possible ways forward. **Please use level descriptors 2**	**30**

Section B descriptor levels:

Descriptor	Award Mark
Consistently meets the level criteria	Mark at top of level
Meets the criteria, but with some inconsistency	Middle, mark to just below top mark
Meets most of level criteria, but not all convincingly	Just below middle, mark to just above bottom mark
On the borderline of this level and the one below	Mark at bottom of level

Level Descriptors 1

Level one, 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

Level two, 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

Level three, 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

Section B descriptor levels:
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 **Level four, 6–12 marks** fulfil limited requirements of the question contain limited understanding of the content required may contain poor balance of content may not contain evaluations make limited use of relevant vocabulary

Section B descriptor levels:
Level five, 1–5 marks fulfil a few 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