

## Paper 1 Mark scheme

Question	Answer	Marks
1(a)(i)	A	(1)

Question	Answer	Marks
1(a)(ii)	B	(1)

Question	Answer	Marks
1(b)	<p>Award 1 mark for identifying the energy source and a further mark for explaining how this source of energy has been lost, up to a maximum of 2 marks:</p> <p>The energy source is warm water/detail of ocean temperatures, e.g. above 26°C (1), overland cyclones are cut off from this source (they lose power) (1).</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question	Answer	Marks
1(c)(i)	<p>1 mark for the correct answer:</p> <p>\$97 billion (1) (or '97' or '97 billion')</p>	(1)

Question	Answer	Marks
1(c)(ii)	<p>Award 1 mark for any of the following:</p> <p>7 000 to 14 million.</p> <p>7 000/14 million</p> <p>7:14000</p> <p>1:2000</p> <p>Accept other correct expressions of the ratio.</p>	(1)

Question	Answer	Marks
<b>1(c)(iii)</b>	<p>Award 1 mark for identifying the vulnerability and a further mark for justifying how the low-lying coastlines increases vulnerability, up to a maximum of 2 marks:</p> <p>low-lying coastlines are vulnerable to storm surge flooding (1) caused by low air pressure within cyclones (1)</p> <p>low-lying coastlines are vulnerable to large waves causing flooding (1) driven onshore by intense winds (1).</p> <p>Reject low-lying land as an explanation, as it is given. Reject reference to human vulnerability, e.g. poverty.</p> <p><b>Accept any other appropriate response.</b></p>	<b>(2)</b>

Question	Answer	Marks
<b>1(d)(i)</b>	<p>Award 1 mark for each correctly identified cause of the distribution, and a further mark for a justification of how the cause might affect volcanic activity, up to a maximum two marks each:</p> <p>clusters/chains of volcanoes near island chains occur on convergent plate boundaries (1) caused by oceanic crust being subducted under continental crust (1)</p> <p>volcanoes in mid-ocean locations are usually those along divergent plate boundary/mid-ocean ridges (1) caused by sea floor spreading (1)</p> <p>few/no volcanoes in the middle of landmasses where there is no plate boundary/conservative plate boundary where there is no magma present (1), which limits volcanic activity from occurring (1)</p> <p>some of the mid-ocean volcanic activity may be due to hotspots (1) which are caused by mantle plumes where the oceanic crust is very thin (1).</p> <p><b>Accept any other appropriate response.</b></p>	<b>(4)</b>

Question	Answer	Marks
<b>1(d)(ii)</b>	B	<b>(1)</b>

Question	Answer	Marks
<b>1(d)(iii)</b>	C E	<b>(2)</b>

Question	Answer	Marks
1(d)(iv)	<p>Award 1 mark for each correctly identified hazard, and a further mark for a justification of how the location of X the causes it, up to a maximum of 2 marks each:</p> <p>earthquakes (1) caused by convergent plate boundary with subduction zone (1)</p> <p>tsunamis (1) caused by undersea earthquake activity (1).</p> <p>Accept secondary hazards such as landslides/liquefaction (1) caused by intense ground shaking/unconsolidated sediments.</p> <p><b>Accept any other appropriate response.</b></p>	(4)

Question	Answer	Marks
1(e)	<p>Award 1 mark for identifying a method of predicting an eruption and a further 2 marks for justifying how the method can predict eruptions, up to a maximum of 3 marks:</p> <p>Measuring bulges/rate of change in bulges in the sides of volcanoes (1) as this shows pressure of the build up of gas/material inside the volcano (1), which can indicate an eruption/release of pressure is imminent (1).</p> <p>Measuring the numerous small earthquakes (1) which are caused as magma rises up through cracks in the Earth's crust (1) in order to identify an increase in frequency/magnitude that means an eruption could be imminent (1).</p> <p>Using thermal imaging techniques and satellite cameras (1) in order to track temperature fluctuations around the volcano (1), which increase when an eruption is imminent (1).</p> <p>Measuring gases released by the volcano (1) in order to determine the chemical make up of the gases (1), which have an increased sulphur content when eruption is imminent (1).</p> <p>Earthquakes:</p> <p>laser beams (1) can be used to detect minor plate movement(1) just before an earthquake (1)</p> <p>a seismometer (1) is used to pick up the vibrations/foreshocks in the Earth's crust (1). An increase in vibrations may indicate a possible earthquake (1)</p> <p>radon gas escapes from cracks in the Earth's crust (1) as the crust moves slightly (1) just before an earthquake</p> <p>rocks crack and expand (1) under the increased stress associated pressure and stress (1) just before an earthquake (1).</p> <p><b>Accept any other appropriate response.</b></p>	(3)

Question	Indicative content
1(f)	<p style="text-align: center;"><b>A02 (4 marks)/A03 (4 marks)</b></p> <p>Expect different natural causes (volcanic eruptions, asteroid strikes, solar variations, orbital geometry) to be identified with comments on their respective timescales.</p> <p><b>A02 (4 marks)</b></p> <ul style="list-style-type: none"> <li>• Global warming is caused by rising of greenhouse gases (human activities; burning fossil fuels, deforestation).</li> <li>• Details of enhanced greenhouse effect; greenhouse gases (CO<sub>2</sub>, methane), incoming and outgoing radiation.</li> <li>• Causes of global warming, e.g. human activities and their gases.</li> <li>• Volcanic eruptions causing climate cooling, e.g. ash and gases blocking incoming solar radiation.</li> <li>• Sun spot activity causes both warming and cooling, details of 11-year sun spot cycle and longer trends.</li> <li>• Orbital changes have different elements – shape of orbit, axial tilt, ‘wobble’ on axis – all operating together, on very long timescales (major cycle is 100,000 years).</li> </ul> <p><b>A03 (4 marks).</b></p> <ul style="list-style-type: none"> <li>• Natural vs human causes, e.g. past natural causes were not manageable, whereas current human causes are theoretically manageable.</li> <li>• Judgement about differences in causes, e.g. natural in the past and the addition of human in the present.</li> <li>• Recognition of similarities and continuation of natural causes in the present day.</li> <li>• Significance of CO<sub>2</sub> in causing global warming and as measured in ice cores linked to past climate change.</li> <li>• Judgement about timescale differences, e.g. limited significance of volcanic eruptions and sun spot variation versus long-term orbital changes and present atmospheric composition changes.</li> <li>• Impacts from volcanic events can be short term but occur frequently; the cooling is minor (less than 1°C/a year or two) but may be compared to large-scale events (e.g. supervolcano eruptions) triggering ‘nuclear winters’ (also true of asteroid collisions).</li> <li>• Orbital changes, although slow, are the main factor behind glacial/interglacial cycles – so they could be seen as the most significant in terms of magnitude and continue into the present day.</li> <li>• Possibility of mechanisms operating in conjunction with one another and/or in opposing directions.</li> </ul>

Level	Mark	Descriptor
	0	<ul style="list-style-type: none"> <li>No acceptable response</li> </ul>
Level 1	1–3	<ul style="list-style-type: none"> <li>Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li> </ul>
Level 2	4–6	<ul style="list-style-type: none"> <li>Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li> </ul>
Level 3	7–8	<ul style="list-style-type: none"> <li>Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li> </ul>

Question number	Answer	Marks
2(a)(i)	B	(1)

Question number	Answer	Marks
2(a)(ii)	A	(1)

Question number	Answer	Marks
2(b)	<p>Award 1 mark for correctly identifying an aspect of development that the HDI measures, and a further mark for the specific measure, up to a maximum of 2 marks:</p> <p>it measures health of the population (1) using life expectancy (1).</p> <p>it measures the educational levels of the population (1) by measuring adult literacy/secondary schooling years (1).</p> <p>it measures GDP per capita (1), which is a measure of the economic development (1).</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question number	Answer	Marks
2(c)	<p>Award 1 mark for identifying a variation using data from Figure 3, and a further mark for a correct reason for the variation, up to a maximum of 4 marks:</p> <p>infant mortality generally falls shown by the fall from 44 to 4 (1) as GDP per capita from 250–42,000 rises (1) because wealthier countries can afford more doctors per person (1) shown by a rise from 0.1 to 2.7 doctors per person (1).</p> <p>Allow other sensible points drawn from both the resource and candidate's own understanding. If data not used limit to 2 marks.</p>	(4)

Question number	Answer	Marks
2(d)(i)	<p>3.128</p> <p>Accept 3.12, 3.13</p>	(2)

Question number	Answer	Marks
2(d)(ii)	<p>Award 1 mark for each comparative statement which uses the data presented, up to a maximum of 2 marks.</p> <p>The cost of a cup of takeaway coffee rises over the period, whereas the cost of coffee beans rise then falls (1).</p> <p>The cost of takeaway coffee rises gradually/steadily between 2009 and 2013, whereas coffee-bean prices are much more variable/change more rapidly (1).</p> <p>In 2010-2011 the cost of coffee barely changed but the cost of coffee beans rose from 120 to 300 (1).</p> <p>Over the whole period the price of coffee beans is virtually unchanged whereas takeaway coffee is more expensive (1).</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question number	Answer	Marks
2(d)(iii)	<p>Award 1 mark for identifying a way in which countries would be affected and a further mark for justifying how they would be affected, up to a maximum of 4 marks:</p> <p>rising prices for coffee beans will deliver higher incomes for farmers (1) which could improve healthcare, access to education or be invested back into farming to help future income (1). Variable/unpredictable commodity prices make planning difficult (1) and low prices could push people into poverty (1)</p> <p>government/business income from exports would be very variable (1) leading to low tax/profits and possible job losses/reduced government spending (1) as income can't be guaranteed (1). Credit the idea that the price of takeaway coffee has no impact on exporting countries (1).</p> <p><b>Accept any other appropriate response.</b></p>	(4)

Question number	Answer	Marks
2(e)(i)	B	(1)



Question number	Answer	Marks
2(e)(ii)	<p>Award 1 mark for each descriptive point up to a maximum of 2 marks:</p> <p>India and Indonesia are projected to have rises in air pollution levels (1), in India's case this is over 20 micrograms (1).</p> <p>India much faster rate of increase than Indonesia (1) data to support e.g. approx. 25 compared to approx. 4 (1).</p> <p><b>Accept any other appropriate response.</b></p>	<b>(2)</b>

Question number	Answer	Marks
2(e)(iii)	<p>Award 1 mark for identifying a consequence of economic growth and a further mark for each linked extension of how this leads to high levels of pollution (air, water or land), up to a maximum of 3 marks.</p> <p>Economic growth is a result of industrialisation (1) and the increase in factories leads to air pollution (1) such as CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub> (1).</p> <p>Economic growth leads to rising demand for fossil fuels (1), which release pollution when burned in power stations/factories/vehicles (1) and waste which is dumped/land-filled (1).</p> <p>Economic growth leads to increased demand for water (1), which is often not treated in emerging countries after it is used (1), leading to chemical/sewage/farm runoff pollution in rivers and lakes (1).</p> <p><b>Accept any other appropriate response.</b></p>	<b>(3)</b>

Question number	Indicative content
2*(f)	<p style="text-align: center;"><b>A02 (4 marks)/A03 (4 marks)</b></p> <p><b>A02</b></p> <ul style="list-style-type: none"> <li>• Rapid economic change will involve both changes to the structure of the economy and changes to its regional geography, as well as a growing GDP.</li> <li>• Rural-urban migration is a consequence of the changing structure of the economy.</li> <li>• There are significant changes to the population data as a consequence of these changes being unevenly spread across society.</li> <li>• In many emerging economies there have been rising inequalities of income.</li> <li>• Impacts will be both positive and negative, with some groups benefiting both economically and socially but others not, especially the urban poor and landless rural populations.</li> <li>• Environmental impacts also affect human health unevenly.</li> </ul> <p><b>A03</b></p> <ul style="list-style-type: none"> <li>• In many emerging societies a powerful elite run the country and have profited from its development and from their relationship with both foreign governments and foreign TNCs.</li> <li>• Improvements in infrastructure and higher government spending have improved levels of health and education for this group and an emerging middle class, often in the major cities.</li> <li>• There are clearly rural groups who are not currently benefiting from rapid economic change because they lose their land as agriculture becomes more commercial.</li> <li>• Urban economies provide only a limited number of relatively well-paid industrial jobs so many new city dwellers are forced into the informal economy.</li> <li>• As a result, high rates of mortality are common in both squatter settlements and shanty towns, and in rural communities.</li> <li>• Long-term development might lead to the increased growth of a middle class with benefits spreading more widely as a consequence.</li> </ul>

Level	Mark	Descriptor
	0	No acceptable response
Level 1	1–3	<ul style="list-style-type: none"> <li>• Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li> </ul>
Level 2	4–6	<ul style="list-style-type: none"> <li>• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li> </ul>
Level 3	7–8	<ul style="list-style-type: none"> <li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li> </ul>

Marks for SPGST		
Performance	Marks	Descriptor
SPaG 0	0	<p><i>No marks awarded</i></p> <ul style="list-style-type: none"> <li>• Learners write nothing.</li> <li>• Learner's response does not relate to the question.</li> <li>• Learner's achievement in SPaG does not reach the threshold performance level, for example errors in spelling, punctuation and grammar severely hinder meaning.</li> </ul>
SPaG 1	1	<p><i>Threshold performance</i></p> <ul style="list-style-type: none"> <li>• Learners spell and punctuate with reasonable accuracy.</li> <li>• Learners use rules of grammar with some control of meaning and any errors do not significantly hinder meaning overall.</li> <li>• Learners use a limited range of specialist terms as appropriate.</li> </ul>
SPaG 2	2–3	<p><i>Intermediate performance</i></p> <ul style="list-style-type: none"> <li>• Learners spell and punctuate with considerable accuracy.</li> <li>• Learners use rules of grammar with general control of meaning overall.</li> <li>• Learners use a good range of specialist terms as appropriate.</li> </ul>
SPaG 3	4	<p><i>High performance</i></p> <ul style="list-style-type: none"> <li>• Learners spell and punctuate with consistent accuracy.</li> <li>• Learners use rules of grammar with effective control of meaning overall.</li> <li>• Learners use a wide range of specialist terms as appropriate.</li> </ul>

Question number	Answer	Marks
3(a)	C	(1)

Question number	Answer	Marks
3(b)	A	(1)

Question number	Answer	Marks
3(c)(i)	<p>Award 1 mark for one of the following, maximum 1 marks:</p> <p>rural to urban migration (1)</p> <p>more jobs/opportunities in megacities (1)</p> <p>escape poverty in rural areas (1)</p> <p><b>Accept any other appropriate response.</b></p>	(1)

Question number	Answer	Marks
3(c)(ii)	<p>Award 1 mark for identification of a reason, and a further one mark for an explanation of this reason, up to a maximum of 2 marks.</p> <p>Land is cheaper at the rural-urban fringe (1) as it is more prone to landslides (1).</p> <p>Accept other reasonable reasons as to why the land is cheaper.</p> <p>People are too poor to afford to live in the CBD/more central area (1) so the access to the CBD/more central area is more problematic (1).</p> <p>Accept other reasonable reasons as to why the people are poor.</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question number	Answer	Marks
3(d)(i)	A	(1)

Question number	Answer	Marks
3(d)(ii)	120 000	(1)

Question number	Answer	Marks
3(d)(iii)	<p>Award 3 marks for correctly completed bar chart. Where there are errors the maximum 3 marks must not be awarded.</p> <p>Errors are incorrectly plotted minute % lines in the bar chart.</p> <p>Allow + or - 1mm for each</p> <p>1 error = 2 marks 2 errors = 1 mark 3 errors = 0 mark</p>	(3)

Question number	Answer	Marks
3(d)(iv)	<p>Award 1 mark for each correctly identified reason and a further mark for a linked extension to that reason, up to a maximum of 4 marks.</p> <p>Megacities are very large (1) so journey times are longer as many people commute large distances/and may use multiple modes of transport so increasing travel time (1).</p> <p>Many people live in the very centre of developing megacities (1) which means the journey time will be short as they can walk/cycle to work (1).</p> <p>In other areas of the country, e.g. rural areas people may live closer to work (1) for instance farming-related jobs (1).</p> <p>Megacities may have heavy congestion/limited transport (1), which leads to longer journey times (&gt;60 min) (1).</p> <p><b>Accept any other appropriate response.</b></p>	(4)

Question number	Answer	Marks
3(e)(i)	<p>Award 1 mark for an identified reason for segregation, and 1 mark each for a link to inequalities in wealth which impacts on quality of life and planning, up to a maximum of 3 marks.</p> <p>Wealthy residents occupy central city in better locations often in gated/protected/managed zones (1), ensuring higher quality of air/water/services (1).</p> <p>Poorer/dispossessed residents are forced to occupy marginal land (1) in unplanned and often illegal unmanaged dwellings with poor infrastructure so a poor quality of life (1).</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question number	Answer	Marks
3(e)(ii)	<p>Award 1 mark for identifying a way in which bottom-up projects can improve housing, and a further one mark for a justification/extension of this improvement, up to a maximum of 2 marks.</p> <p>Micro-credit systems (1), which allow communities/residents to access resources to make targeted housing improvements (e.g. better roofing materials) (1).</p> <p>Community schemes improving access to lawyers (1) so that residential rights can be secured (1).</p> <p><b>Accept any other appropriate response.</b></p>	(2)

Question number	Answer	Marks
3(f)	<p>Award 1 mark for identifying a correct cause of the problem and a further mark for expansion, up to a maximum of 4 marks:</p> <p>Water supply Rising population increases demand for water (1), creates pressure on supply from ground water/other sources (1).</p> <p>Rising population increases waste/pollution (1) which contaminates local water supplies/decreasing the quality of water supply (1).</p> <p><b>Accept any other appropriate response.</b></p>	(4)

Question number	Indicative content
3(g)	<p style="text-align: center;"><b>AO2 (4 marks)/AO3 (4 marks)</b></p> <p>The chosen megacity can be in the developed or developing world.</p> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Rapid population growth will lead to a higher consumption of resources, including land, water, energy and food.</li> <li>• Rapid population growth will lead to a problem of managing increasing amounts of waste.</li> <li>• Rapid population growth will pose a strain on existing infrastructures.</li> <li>• Attempts to improve sustainability can be top-down improvements in public transport/schemes, e.g. bus lanes, increasing rail links, park-and-ride which will decrease waste and improve sustainability.</li> <li>• Attempts to improve sustainability might include urban farms and allotments, recycling schemes, affordable housing and 'greening' cities, which will decrease waste and increase output.</li> <li>• There are contrasts in the effectiveness of top-down and bottom-up schemes.</li> </ul> <p><b>AO3</b></p> <ul style="list-style-type: none"> <li>• Evaluation involves a judgement made about the relative success of different schemes projects, with some attempt to establish the criteria by which success might be measured.</li> <li>• Population growth poses a challenge because the rate of city growth might overwhelm the attempts to improve its living environment and the quality of life of its citizens.</li> <li>• Success can be measured using improvements in life expectancy, improved levels of education, reduction in crime, economic growth and a reduction in inequalities.</li> <li>• Some schemes have better success rates than others, e.g. success of doorstep collections compared to low success rate of recycling centres).</li> <li>• Success might depend on the public's willingness to change, e.g. switching from cars to buses.</li> <li>• Some schemes might be seen as tokenistic, e.g. urban food production is small scale and has little overall impact on urban sustainability.</li> <li>• Large-scale regeneration attempts could be viewed as more successful as they address economic, social and environmental sustainability, and affect larger numbers of people and perhaps address the issues caused by rapid growth.</li> </ul>



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Level 3	7–8	<ul style="list-style-type: none"> <li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li> <li>• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li> </ul>

