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**ENVIRONMENTAL MANAGEMENT**

**0680/12**

Paper 1

**October/November 2017**

MARK SCHEME

Maximum Mark: 60

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**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.

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This document consists of **9** printed pages.

Question	Answer	Marks
1(a)(i)	ammonia <b>B</b> nitrate <b>A</b> nitrification <b>C</b> ;;  <i>3 correct [2 marks]</i> <i>1 or 2 correct [1 mark]</i>	<b>2</b>
1(a)(ii)	it is used to make, amino acids / proteins / chlorophyll / chloroplast / DNA; for, growth / repair / photosynthesis / cell division;	<b>2</b>
1(a)(iii)	<i>any four from:</i> nitrate / phosphate; wash off into rivers; cause algae to, grow / reproduce; algae die; block sunlight; (bacteria) decompose / respire algae; (bacteria) use up oxygen; lack of oxygen kills fish; <i>ref to eutrophication;</i>	<b>4</b>

Question	Answer	Marks
1(a)(iv)	<p><i>ref to GM crops;</i> e.g. fix nitrogen / pest resistant;</p> <p>plant breeding; e.g. for pest resistance / to grow with less nitrogen;</p> <p>mixed cropping / crop rotation; to reduce soil exhaustion / use of a legume;</p> <p>(improved) irrigation / method described; to allow more growth / photosynthesis;</p> <p>legumes; to fix nitrogen;</p> <p>organic fertilisers; provide nutrients / improve water retention;</p> <p>use of a pesticide / herbicide / fungicide; stop crop being eaten / remove competition;</p>	2

Question	Answer	Marks
2(a)(i)	(7 – 2.4 =) 4.6 (billion);	1
2(a)(ii)	(0.343 × 100% =) 34.3 / 34 ;; (if answer incorrect, allow one mark for correct method, e.g. 2.4 / 7 [1]);	2
2(a)(iii)	<p>any three from:</p> <p><i>urban:</i>  more people (making it worthwhile to) install, pipework / sewage treatment ;  greater density of population (making it worthwhile to) install pipework / sewage treatment ;  people have, more power / influence, so it is easier to pressure the government;  the government have more interest in providing water to the people;  tourists are more likely to visit if clean water is available;  more money / rich people, to pay for their water;  leading to improved pipework / sewage treatment;</p> <p><i>rural:</i>  <i>ref to</i> a rural problem, e.g. terrain / making it difficult to install water system;  no machinery making it difficult to install water system;</p> <p>AVP;</p>	3
2(b)(i)	bilharzia OR malaria;	1
2(b)(ii)	<p>any three from:</p> <p>correctly named vector;  drain water <b>to</b> remove breeding site;  use of insecticide / chemical, to kill vector;  wear clothes / use of nets, to prevent vector feeding / biting;  sterilise males, to reduce breeding / reproduction;  pour oil on water, to stop breeding;  use of fish, to eat larvae;</p>	3

Question	Answer	Marks
3(a)(i)	<i>any two for <b>one</b> mark:</i> wind / wave / tide / HEP / geothermal / nuclear / solar / biomass / biofuel;	<b>1</b>
3(a)(ii)	USA <b>and</b> Russia;	<b>1</b>
3(a)(iii)	720 (million tonnes) ;; <i>(if answer incorrect, allow one mark for correct method, e.g. <math>0.09 \times 8000</math> [1]);</i>	<b>2</b>
3(b)(i)	<i>any three from:</i> electric cars produce no (local) air pollution / emission of gases; as do not burn, a fuel / named fuel; less health issues / named health issue in cities; but if the power comes from, fossil fuelled power station / hybrid car engine; then using them does produce air pollution indirectly; inefficient to transfer the energy from power station to car; production of car still produces air pollution;	<b>3</b>
3(b)(ii)	<i>any three from:</i> reduce the use of appliances; turning off appliances when not in use; energy saving appliances / low energy light bulbs; insulation; solar panels; small scale wind turbine; choose a green energy supplier / use biofuel; reduce use of car by, walking / public transport / bicycling; more efficient use of the car, e.g. car sharing / catalytic converter / better fuel consumption; <i>ref to low / no, CFC appliances;</i>	<b>3</b>

Question	Answer	Marks
4(a)(i)	<b>C as seen</b> (cold current going in direction of pole to equator);	<b>1</b>
4(a)(ii)	<b>W as seen</b> (warm current going in direction of equator to pole);	<b>1</b>
4(a)(iii)	<i>any four from:</i> cold current / cold and warm current meeting / upwelling; bring / contain, nutrients (from sea bed); these encourage growth of phytoplankton; which are fed on by zooplankton; which are fed on by fish, leading to more fish; (cold currents) are rich in oxygen; for respiration;	<b>4</b>
4(b)(i)	(decreases water quality by) carries diseases / may lower oxygen availability / may add, toxic chemical / heavy metals to the ocean; AVP;	<b>1</b>
4(b)(ii)	<i>any three from:</i> treated / passed through a sewage plant before disposal; dispose of in small quantities; filtered / remove solid material; acted on by microbes / digested to remove nutrients; <i>ref to</i> government control / legislation on the quality of sewage;	<b>3</b>

Question	Answer	Marks
5(a)(i)	<p><i>any four from:</i>  trees removed / no trees;  no low-lying shrubs / grasses etc.;  no vegetation / bare soil;  desert;  land cleared for, arable farming / animals grazing ;  overgrazing / trampling;  overcultivation;  soil erosion / exhaustion / dry;</p>	4
5(b)(i)	<p>indication in drawing of horizontal “ledges” / step / wall / etc.;  reasonable label e.g. flat land / step / plants on flat land / step / wall;</p>	2
5(b)(ii)	<p>stops rapid flow of water / run-off / more infiltration / carrying soil away;  due to no slope / flat surfaces for growing / wall blocking water flow / hold soil back;</p>	2
5(b)(iii)	<p><i>any two from:</i>  increases area for farming;  allows high parts to get adequate water, as it does not run away / fertilisers do not run away ;  easier to work the land when flat;  can use machinery when field is flat;</p>	2

Question	Answer	Marks
6(a)(i)	<p><i>any two similarities with one difference OR any two differences with one similarity:</i></p> <p><i>similarities:</i>  <i>both in:</i>  in western / coast of N. America;  in western / coast of S. America;  far east / between Asia and Oceania / south Asia / southeast Asia / east Asia;  east Africa;  in ocean west of Africa / between Africa and S America / south Atlantic;  in ocean west of S America / south Pacific;  Pacific ring of fire / around the edge of the Pacific;  southern Europe;  North Atlantic / Iceland;  on plate boundaries;  none in Oceania / Australia;</p> <p><i>differences:</i>  <i>volcanoes only in:</i>  mid Pacific / middle of ocean west of Americas;  NW Africa / middle of Africa;  south pole / Antarctica;  south east Africa / between Madagascar / Indian ocean;  <i>ref to hotspot;</i>  AVP;  <i>earthquakes only in:</i>  S / central / inland, Asia / Himalayas;  Mid-Atlantic Ridge MAR / line between east of Americas and west of Africa;</p>	3
6(a)(ii)	<p><i>any three from:</i>  can avoid living in those places / recognise danger zones;  can monitor for signs of occurrence;  in order to predict;  prepared to evacuate when signs are seen;  communication of signs ready when seen;</p>	3
6(b)(i)	coal / oil / gas / fossil fuel;	1



<b>Question</b>	<b>Answer</b>	<b>Marks</b>
6(b)(ii)	<i>any three from:</i> <i>ref to disposal of radioactive waste;</i> <i>waste has a long (half) life;</i> <i>cost of building / maintaining plants is high;</i> <i>danger to workers from radiation;</i> <i>danger from accident;</i> <i>AVP;</i>	<b>3</b>