



Cambridge International Examinations
Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT

5014/11

Paper 1

October/November 2016

MARK SCHEME

Maximum Mark: 120

Published

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Question	Answer	Marks
1(a)(i)	fault/faulting	1
1(a)(ii)	folded / folding (sideways) compression	1
1(a)(iii)	<p><i>advantage of A</i> any 1 of: can be accessed, from the surface / by adit / drift / open cast; straight seam / easy access;</p> <p><i>disadvantage of A</i> any 1 of: thin seam; need two shafts to access both sides of the fault / tunnel needs to change height;</p> <p><i>advantage of B</i> any 1 of: thick seam; continuous / more coal;</p> <p><i>disadvantage of B</i> any 1 of: deep(er) / shaft needed to access it / can't be accessed from surface; change in height of tunnel; more subsidence possible;</p>	4
1(b)	coal is a sedimentary rock that formed on land; the main content of coal is carbon;	2
1(c)	any 2 of: to prevent depletion of coal stocks; to reduce release of carbon dioxide which causes global warming; to reduce release of sulfur dioxide / oxides of nitrogen, which cause acid rain; belief that potential dangers of nuclear can be effectively controlled; volume of waste generated with coal is greater; reference to relative amount of energy released;	2

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Question	Answer	Marks
2(a)(i)	<p><i>any 2 of:</i> low/little (annual amount); decreases westwards/higher towards the east/less near the ocean; varies from less than 50mm in the west to more than 300mm in the east; AVP;</p>	2
2(a)(ii)	<p>highest – E medium – C lowest – D 3 correct = 2, 1/2 correct = 1</p>	2
2(a)(iii)	<p><i>any 2 of:</i> there is not enough to satisfy all the demand; to preserve enough for other users; so river does not dry up;</p>	2
2(a)(iv)	<p><i>Expect E but allow C or D if justified. Accept any sensible reason, such as:</i></p> <p>E – users are of the greatest value to the economy /to ensure supply to hospitals /sanitation /drinking water for the (human) population /AVP</p> <p>C – commercial /wildlife farms may be for food /valuable to the economy /AVP;</p> <p>D – tourism / wildlife parks are valuable to the economy /AVP;</p>	1

Page 4	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
2(b)(i)	<i>any 2 of:</i> dams across rivers; storage reservoirs; pipelines (take the water to E); tap underground supplies / wells / boreholes; desalination of sea water; water capture (clarified); emergency water tanker / bowser; construction of new river route / channels;	2
2(b)(ii)	<i>any 1 of:</i> reuse / recycle, water; use appliances economical with water; mend, dripping taps / bursts quickly; catch / store, rainwater; AVP;	1

Question	Answer	Marks
3(a)(i)	wind;	1
3(a)(ii)	hill-top / upper part of hill / free from trees or obstructions;	1
3(a)(iii)	open / exposed to wind / no or few obstacles to slow the wind / way from houses (so won't cause noise or vibration);	1
3(a)(iv)	<i>any 3 of:</i> blade / arm; tower / shaft / pillar / pole; turbine / generator (at centre of blades); transformer (at base) nacelle / housing (case around generator) etc.;	3

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Question	Answer	Marks
3(b)(i)	<i>any 3 of:</i> wind-borne pollution; rainfall cannot be prevented; source region a distance away; source region may be in another country; depends on prevailing wind;	3
3(b)(ii)	<i>any 1 of:</i> damage to leaves of trees / plants; acidification of lakes / rivers / soil; harms fish / aquatic life; damages limestone rocks;	1

Question	Answer	Marks
4(a)(i)	denitrifying;	1
4(a)(ii)	ammonium;	1
4(a)(iii)	<i>any 1 of:</i> they eat the plants that contain nitrates; produce urine / faeces / waste; containing nitrogen; their bodies decompose to return ammonium to the soil;	1

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Question	Answer	Marks
4(b)	food chain disrupted; animals will, lose their preferred habitat / will die / relocate; water loving plants / example of, will die; animals / plants requiring dry habitats, become established; soil will be, drier / contain more air; anaerobic bacteria replaced by aerobic bacteria; plant succession may occur; shrinkage of peat reduces the level of the land;	3
4(c)	population pressure / increased population; the need for more land for housing; farming; industry; to rid the area of a source of water-related disease; to remove the habitat of dangerous animals / e.g. alligators / crocodiles etc.;	4

Question	Answer	Marks
5(a)(i)	<i>any 3 of:</i> close to / around / along / north of, the Arctic Circle; 60–75 degrees north (accept figure within latitude range); in the northern hemisphere; along the northern margins (of continents); in North America / Europe / Asia / named country;	3
5(a)(ii)	<i>any 1 of:</i> the area of tundra will reduce / shrink / become smaller; the margin / edge of tundra will move further north;	1

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Question	Answer	Marks						
5(a)(iii)	<p><i>any 4 of:</i></p> <p>carbon dioxide: factories / power stations / burning fossil fuels / burning rainforests / deforestation / vehicle exhausts;</p> <p>methane: intensive cultivation / paddy fields / landfill;</p> <p>nitrous oxide / nitrogen oxides: vehicle exhausts / transport;</p> <p>CFCs: aerosols / fridges;</p> <p>water vapour: power stations;</p>	4						
5(b)(i)	both points correctly plotted; correct completion of the line:	2						
5(b)(ii)	<table border="1"> <tr> <td>number of months below freezing</td> <td>9</td> </tr> <tr> <td>the month with the highest precipitation</td> <td>July</td> </tr> <tr> <td>annual temperature range</td> <td>34 (°C)</td> </tr> </table>	number of months below freezing	9	the month with the highest precipitation	July	annual temperature range	34 (°C)	3
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Question	Answer	Marks
5(b)(iii)	<p><i>any 4 of:</i> low growing / close to the ground; for protection against the wind;</p> <p>short roots; t to avoid the permafrost / frozen ground;</p> <p>small leaves; t to reduce loss of water by transpiration;</p> <p>life cycle is short; to flower and set seed in short growing season;</p> <p>cup / rosette shape; efficient light collection in centre of plant / retains heat;</p> <p>reproduce by budding / division; to make maximum use of short growing season;</p>	4
5(c)(i)	an animal that eats green plants / an animal that eats another animal	1
5(c)(ii)	<p><i>any 4 of:</i> disrupts current food chain; more food for polar bear and wolves; less food for arctic fox and snowy owl; less territory for arctic fox; numbers of arctic fox may decrease: red fox might out compete arctic fox; numbers of primary consumers would reduce / named example;</p>	4

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Question	Answer	Marks
5(d)(i)	<i>any 3 of:</i> from dead organisms; on sea beds / swamps; covered (in sediments); compressed / pressure; reference to millions of years;	3
5(d)(ii)	Prudhoe Bay; Valdez; Yukon;	3
5(d)(iii)	<i>any 1 of:</i> route too dangerous / risk of oil spill; north part of the sea would be frozen for much of the year; more direct route / faster transport; cheaper once built;	1
5(e)(i)	<i>any 3 of:</i> vegetation would be damaged / habitat loss; vegetation will take time to recover; oil spills / any impact of oil spills; caribou cannot migrate and look for food / caribou would have less food / forced to migrate; could disturb breeding of the caribou; might frighten caribou away; visual pollution / ruin the view / noise pollution / air pollution (if qualified); melting permafrost / boggy ground;	3
5(e)(ii)	<i>any 2 of:</i> to stop the warm oil coming in contact with the ground / prevent melting of the permafrost; so caribou (and other animals) could pass underneath the pipeline; reduces heat loss from oil in pipeline; easier to build / maintain;	2

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Question	Answer	Marks
5(f)	<p>Level marked question</p> <p>Indicative content:</p> <p>Fossil fuels will run out / are non-renewable / alternative energy sources are renewable / will last into the future</p> <p>Fossil fuels cause global warming / air pollution / acid rain / alternative energy sources are cleaner / less polluting</p> <p>Fossil fuels are subject to price fluctuations / security of supplies / conflicts</p> <p>Fossil fuels can cause problems during transport, e.g. oil spills</p> <p>Dangers of mining accidents / extracting fossil fuels</p> <p>Scars on the landscape from mining</p> <p>Use of alternative fuels will make fossil fuels last longer</p> <p>Some alternative energy supplies are cheaper to run</p> <p>Sites for alternative energy are limited</p> <p>Some need a lot of land to generate a small amount of energy</p> <p>Costly to set up</p> <p>Some countries may not have the technology – developing</p> <p>Unreliable, e.g. sun does not always shine idea</p> <p>Abundant supplies of fossil fuels locally</p> <p>Fossil fuels are energy rich</p>	6

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Question	Answer	Marks
6(a)(i)	correct plot	1
6(a)(ii)	8500 <u>million</u>	1
6(a)(iii)	<p><i>any 5 of:</i></p> <ul style="list-style-type: none"> declining infant mortality rate; high / increasing birth rates; lack of available contraception; people (in LEDCs) cannot afford contraception; lack of education about how to use contraception; high infant mortality rate so people have more children in the hope that some will survive; death rates are falling / high life expectancy / people live longer; cures for diseases / better medical facilities; vaccinations; improved sanitation; improved water supply; government incentives; religious beliefs / ban on abortion / contraception; abundance of food / better farming methods; 	5
6(b)(i)	<p><i>any 5 of:</i></p> <ul style="list-style-type: none"> fuel wood / for heating and lighting; subsistence farming / slash and burn / shifting cultivation / to provide food; commercial farming / cash crops / plantations; urbanisation / settlement; timber / commercial logging; mineral extraction; cattle ranching / to sell beef to other countries; roads / for communication; 	5
6(b)(ii)	20676 (km ²)	1

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Question	Answer	Marks
6(b)(iii)	<i>any 2 of:</i> it has decreased / fallen; approximately halved in 3 years; correct data quote;	2
6(b)(iv)	greater concern for environmental issues / concerns over global warning / new rules or laws;	1
6(c)(i)	<i>any 3 of:</i> fewer trees to photosynthesise; (therefore) less carbon dioxide removed; increased levels of carbon dioxide in the atmosphere; carbon dioxide released from burning rainforests;	3
6(c)(ii)	<i>any 4 of:</i> soil has no protection from trees / soil left bare; (less interception so) more surface run-off; sun can dry soil; (less humus / decaying vegetation so) soil becomes infertile; rainwater leaches minerals from soil; less humus so soil less cohesive / loses structure; no roots to bind the soil; soil is eroded;	4
6(d)	<i>any 4 of:</i> draining of wetlands; dam building; (intensive) agriculture / grazing; trawling; tourism or specific example; named type of relevant pollution, e.g. heavy metal, fertilisers, oil spill, acid rain; mining; construction / road building;	4

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Question	Answer	Marks
6(e)(i)	suitable scale and y-axis labelled; correct labelling of countries; correct plots;;	4
6(e)(ii)	Kenya;	1
6(e)(iii)	<i>any 1 of:</i> more land available; more wildlife / more endangered species; government supports / invests in national parks; more concern for the environment; AVP;	1
6(e)(iv)	<i>any 1 of:</i> sustainable harvesting; wildlife reserves; world biosphere reserves; gene banks; education; laws: zoos; AVP;	1

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Question	Answer	Marks
6(f)	Level marked question Indicative content: agroforestry community forestry reforestation sustainable harvesting fuel wood planting genetic engineering efficient use of timber recycling alternatives materials to timber education prevention of deforestation laws and permits/licensing monitoring introduction of eco-tourism forest reserves protected areas	6