
ENVIRONMENTAL MANAGEMENT

5014/11

Paper 1

October/November 2016

MARK SCHEME

Maximum Mark: 120

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.

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Page 2	Mark Scheme	Syllabus	Paper
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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> <i>any 1 of:</i> can be accessed, from the surface / by adit / drift / open cast; straight seam / easy access;</p> <p><i>disadvantage of A</i> <i>any 1 of:</i> thin seam; need two shafts to access both sides of the fault / tunnel needs to change height;</p> <p><i>advantage of B</i> <i>any 1 of:</i> thick seam; continuous / more coal;</p> <p><i>disadvantage of B</i> <i>any 1 of:</i> 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)	<p><i>any 2 of:</i> 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;</p>	2

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Question	Answer	Marks
2(a)(i)	<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;	2
2(a)(ii)	highest – E medium – C lowest – D 3 correct = 2, 1/2 correct = 1	2
2(a)(iii)	<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;	2
2(a)(iv)	<i>Expect E but allow C or D if justified. Accept any sensible reason, such as:</i> E – users are of the greatest value to the economy /to ensure supply to hospitals /sanitation /drinking water for the (human) population /AVP C – commercial /wildlife farms may be for food /valuable to the economy /AVP; D – tourism / wildlife parks are valuable to the economy /AVP;	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

Page 5	Mark Scheme	Syllabus	Paper
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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

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
4(b)	<p>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;</p>	3
4(c)	<p>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.;</p>	4

Question	Answer	Marks
5(a)(i)	<p><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;</p>	3
5(a)(ii)	<p><i>any 1 of:</i> the area of tundra will reduce / shrink / become smaller; the margin / edge of tundra will move further north;</p>	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></p> <p>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></p> <p>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> 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;</p>	5
6(b)(i)	<p><i>any 5 of:</i> 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;</p>	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

Page 14	Mark Scheme	Syllabus	Paper
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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