Cambridge
O Level

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Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT **5014/11**

Paper 1 **May/June 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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Section A

Question	Answer	Marks
1(a)(i)	A; C; D;	**3**
1(a)(ii)	magma is rising / volcano formed;	**1**
1(b)(i)	*any 2 of:* it is very hot / molten; can set fire to objects with which it comes into contact; destroys buildings / vegetation / etc.; it is mobile; it can be rapid; kills wildlife / livestock / people;	**2**
1(b)(ii)	earthquake / tsunami;	**1**
1(c)	*any 3 of:* roads have poor surfaces / routes are cut (by lava / ash) / access is difficult; communication by telephone / internet is difficult; the disaster is large-scale; no / few evacuated before the disaster / disaster not forecast; poor economies / LEDCs / less developed country which lack sufficient numbers of relief teams / shelters / medical staff; major eruption will have greater impact on relief efforts than minor eruption; type of eruption – explained;;; (e.g. if Mt St Helens type with large amounts of ash, lahars, mudflows, etc. will make access more difficult and will cause more damage / affect more people / affect wider area AVP; *accept the opposite emphasis on why relief can be supplied more easily*	**3**

Question	Answer	Marks
2(a)(i)	800 000 and 1967–1969;	**1**
2(a)(ii)	the catch / fish stocks had been declining rapidly;	**1**
2(a)(iii)	no and fishing ended (in 1992); OR partly / yes and fish caught increased for a time;	**1**
2(b)	*any 4 of:* bottom sea trawling – damaged food chain / caught deep stocks; use of radar – enabled shoals to be found; large nets – caught large(r) numbers of fish; large boats / factory ships – could deal with more / large numbers of fish; refrigerated vessels – could stay fishing / at sea longer; *credit each line with up to two marks: one for the method and one for the explanation of its effect.* *allow a maximum of 3 for methods.* *effects must be related to a method.*	**4**
2(c)(i)	*any 1 of:* (too) few fish of reproductive age were left; pollution; illegal fishing; climate change;	**1**
2(c)(ii)	*any 2 of:* because many would lose their way of life / incomes / employment; the whole community would be badly affected / economic downturn / services would lose income; possibility that voters would turn against them; short-term politics; AVP;	**2**

Question	Answer	Marks
3(a)(i)	*any 2 of:* tropical; 10 °S to 20 °N Central America; South America; one / the Philippines in Asia;	**2**
3(a)(ii)	*any 3 of:* northern countries have the purchasing power; aware of the healthy properties of bananas / need for fruit in diet; north too cold to grow bananas / climate further south suits the growth of bananas; countries growing bananas / further south are less developed and more likely to rely on farming / export produce; bananas are a cheap fruit;	**3**
3(b)	horizontal line at 2000;	**1**
3(c)(i)	*any 3 of:* provides employment / income for workers; helps to pay for imports; provides foreign exchange / increases economy / GDP; helps to pay for the development of infrastructure / example of; improves standing in the world;	**3**
3(c)(ii)	crop grown for farmer and family to eat / not for sale (unless surplus);	**1**

Question	Answer	Marks
4(a)(i)	*any 3 of:* conical / coniferous; short branches; sloping branches; all look alike; thin; dark foliage;	**3**
4(a)(ii)	taiga;	**1**
4(b)	*any 3 of:* rocky ground; short growing season; very cold winters; frozen ground / permafrost; infertile / few plant nutrients; thin soil;	**3**
4(c)	*economic* timber / construction / furniture; poles; pulp / paper; employment *environmental* habitat / food for birds / animals / insects; prevents soil erosion; helps maintain the oxygen / carbon dioxide balance of the atmosphere; reduces global warming; transpires water vapour into the atmosphere; *at least one from each group for maximum.*	**3**

Section B

Question	Answer	Marks
5(a)(i)	both divisions correct;; (one division correct;) key completed to match pie chart;	3
5(a)(ii)	*air* respiration for soil organisms: respiration for plants; needed for decomposition; oxygen / respiration for roots; *water* needed for photosynthesis; dissolves minerals / nutrients for take up by plants; prevents wilting / hydrates plants; *max 2 on either air or water*	3
5(a)(iii)	*any 4 of:* decomposition; of (dead) plant material; of (dead) fauna); and turn them into nutrients / humus / minerals; worms aerate the soil; move down / mix organic material through the soil; role of organisms in: carbon cycle, nitrogen cycle, sulfur cycle;	4
5(b)(i)	2.5–3.0 times;	1
5(b)(ii)	correct scale on x and y axes; correct labelling of *y*-axis; 5 or 6 points plotted correctly;; (3 or 4 points plotted correctly;) *± half small square tolerance on plotting*	4

Question	Answer	Marks
5(b)(iii)	*any 1 of:* cheaper meat; from agricultural intensification / more meat available; increased wealth (in developing countries) – however indicated; growth of fast food chains;	**1**
5(c)(i)	Africa;	**1**
5(c)(ii)	North America and Oceania;	**1**
5(c)(iii)	*any 2 of:* tradition / beliefs; wealth explained / less developed explained / too expensive; infrastructure such as transport, refrigeration; suitability of land / climate for crop growing / animal rearing; much meat exported; other sources of protein;	**2**

Question	Answer	Marks
5(c)(iv)	*soil erosion* trampling destroys vegetation; trampling compacts soil; overgrazing; animals pull roots from soil; soil becomes exposed to wind / water; gets blown / washed away; *water pollution* produce (a lot of) waste / faeces; can add pathogens / harmful bacteria / viruses; fertilisers added (to fodder crops); gets washed into groundwater / streams / rivers; (or) animals defecate in water; nitrates increase in water; leading to eutrophication; *allow development marks, for example on impact of compacting soil, nutrients in water, etc.* *max 3 on either soil erosion or water pollution*	**5**
5(d)(i)	6.5;	**1**
5(d)(ii)	1000 times;	**1**
5(d)(iii)	*any 3 of:* cattle produce (large amounts of) methane; methane is a greenhouse gas; which has much greater effect per molecule than carbon dioxide; forests cleared to create cattle farms; burning forests give off carbon dioxide / reduces carbon dioxide uptake; carbon dioxide is a greenhouse gas; so could lead to (enhanced) global warming; explanation of how greenhouse gases trap heat to max 1;	**3**

Question	Answer	Marks
5(e)(i)	1;	**1**
5(e)(ii)	*any 3 of:* new pesticides less toxic; smaller amounts applied; laws to restrict / ban use of pesticides; restrictions on most hazardous / dieldrin and lindane;	**3**
5(f)	*Indicative content* excess fertilisers washed into water courses leading to algal blooms and eutrophication, with effects of plant and animal life in the water; controlled application to limit excess fertilisers and possibly use of organic fertilisers; clearance of algal blooms, oxygenation of water courses affected; Level 3 5–6 marks answers the question and provides detailed explanation of how fertilisers can damage the environment and then how those impacts can be reduced. Level 2 3–4 marks some detail of how fertilisers can damage the environment with some explanation of reduction of damage. OR provides detailed explanation of how fertilisers can damage the environment, but nothing worthy of credit on reduction or vice versa. Would need the one good part to be very good to achieve top of the level. Level 1 1–2 marks basic descriptive points with little or no explanation. May just be a list with little or no answer to the part on reduction. no response or no creditable response, 0.	**6**

Question	Answer	Marks
6(a)(i)	*any 2 of:* same amount of heat / energy in both rays; smaller area to heat up at Equator / larger area to heat at Arctic Circle / high angle of incidence at Equator, low angle at Arctic Circle; lower albedo at Equator / owtte; less energy loss at Equator as shorter distance through atmosphere;	**2**
6(a)(ii)	*any 2 of:* snow and ice have higher albedo / forests have lower albedo; so ice and snow reflect back most of solar energy; forests darker so absorb more solar energy; photosynthesis will absorb energy in forests / energy needed for growth;	**2**
6(b)	November; Bruce ; Christine; 3; April; 204;	**6**
6(c)(i)	16;	**1**
6(c)(ii)	5;	**1**
6(c)(iii)	6–7;	**1**
6(c)(iv)	*onto land* need warm water (to provide energy); mention of role of latent heat; so energy source cut off; *south* oceans become cooler; so less energy to power the cyclone; *max 2 on land or south*	**3**

Question	Answer	Marks
6(c)(v)	*any 4 of:* cyclones at their strongest at the coast; many coastal areas densely populated; low-lying areas liable to flooding from heavy rainfall; low-lying areas liable to flooding from storm surges; as strong winds create large waves; and low pressure raises sea level; allow flooding for 1 mark even if no cause given;	**4**
6(c)(vi)	*any 3 of:* less educated about coping with a cyclone; houses less strong; technology for advance warning less advanced; warnings may not get through to people; fewer (if any) cyclone shelters; search, rescue, medical facilities less good; poor communication system; evacuation less likely; medium and/or long-term effects to max. 2;;	**3**
6(d)(i)	*any 3 of:* easterly winds weaken; warm water current moves eastward / towards Peru; rather than the usual westward direction / towards Australia; cold Peruvian current blocked / replaced by warm water;	**3**
6(d)(ii)	*any 2 of:* warm water off the coast; so more evaporation; warm air (by ocean) likely to rise; leading to condensation / cloud / rain;	**2**
6(d)(iii)	heavy rain improves agriculture (or similar);	**1**

Question	Answer	Marks
6(e)(i)	phytoplankton; zooplankton; fish; all correct = [2] 1 or 2 correct = [1]	**2**
6(e)(ii)	*any 3 of:* less food for fish / whales so their numbers reduce; less fish for seals and penguins so their numbers reduce; less seals and penguins so shark numbers reduce; if no specifics can award 1 mark for general comment on reduction of all species in higher trophic levels; phytoplankton will start to increase;	**3**

Question	Answer	Marks
6(f)	*Indicative content* droughts tend to last longer and affect larger areas than floods or cyclones; floods and cyclones cause more damage to property than droughts; all can lead to soil erosion and loss of crops / animals; cyclones and floods are short-term and may require emergency rescue, shelter, food, etc.; effects of drought, being longer term, can be planned for, but can cause far more deaths than the others if no food aid, etc.; most environments recover from such disasters; it will depend on the severity of each disaster as to environmental effects, though flooding and cyclones more likely to result in pollutants being washed into water courses or the sea; Level 3 5–6 marks must communicate the features of at least one other climatic hazard besides droughts. Answers the question with detailed consideration of climatic hazards. Must look at both sides of the argument, so must be some discussion of floods and/or cyclones as well as droughts and their relative impacts. Level 2 3–4 marks Considers both sides (i.e. other climatic hazards besides droughts) with some details OR detailed consideration of one climatic hazard (probably droughts) Level 1 1–2 marks basic descriptive points with little or no reasoning. May just be a list of impacts of cyclones and an agreement without mention of other climatic hazards. no response or no creditable response, 0.	**6**