Cambridge International Examinations
Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT **5014/11**

Paper 1 **May/June 2017**

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.

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This document consists of **12** printed pages.

Section A

Question	Answer	Marks
1(a)(i)	division at either 26 or 80; largest segment shaded as Malaysia / smallest segment shaded as China;	**2**
1(a)(ii)	*allow any answer in range of:* 61–63 (thousand tonnes);	**1**
1(a)(iii)	*any three of:* low grade / many impurities; so low price / could not compete on the world market; difficult to access / mountainous / steep slopes / no communications / distance from port; deep so expensive / difficult to access; thin / small deposits expensive to exploit;	**3**
1(b)(i)	they contain other substances which are not used / need to extract the useful metal from the rest of the rock;	**1**
1(b)(ii)	*any three of:* recycle used products; increase efficiency of use; extract from spoil heaps; substitute other materials; example of a substitute for a mineral; influence of new technology, e.g. miniaturisation;	**3**

Question	Answer	Marks
2(a)(i)	urban population with access to good sanitation;	1
2(a)(ii)	6.8;	1
2(a)(iii)	all better than the 2015 target except rural access to safe water / target already achieved in 3 out of the 4 / <u>only</u> rural access to safe water had not reached the 2015 target;	1
2(b)	*any three of:* economies of scale / cost per property cheaper to provide; easier to access in cities / rural populations often more remote / inaccessible; cities are wealthier authorities / have wealthier people; cities are important economically / industries / factories need water; more pressure can be put on the authorities in cities; better educated population able to campaign more effectively; politicians usually live in urban areas;	3
2(c)	*any four of:* contaminated with animal faeces; contaminated with fertilisers / insecticides / pesticides / chemicals used in farming; contaminated by domestic waste; bilharzia snails; fleas deposit (Guinea) worm larvae in water; typhoid / cholera / dysentery / diarrhoea often caught by drinking contaminated water; mosquitoes breed in stagnant water;	4

Question	Answer	Marks
3(a)(i)	*any two of:* pipe; sprinkler / sprays; rotates; movable;	**2**
3(a)(ii)	*any one of:* some evaporates; some is falling on bare soil;	**1**
3(b)(i)	trickle drip irrigation;	**1**
3(b)(ii)	it goes to the root / less evaporation;	**1**
3(c)(i)	*any two of:* it helps keep a protective cover of plants on the soil; wet soil particles are heavier and less likely to blow away; water binds soil particles together;	**2**
3(c)(ii)	*any three of:* overgrazing / overstocking / animals exceed the carrying capacity; without rotating the pasture; leaves soil bare; no roots to hold the soil; wind blows / water washes, particles away; movement trails / hoof damage;	**3**

Question	Answer	Marks
4(a)(i)	high / medium;	1
4(a)(ii)	*any two of:* houses close together / people in close proximity; lack of clean water supplies; lack of sanitation / sewage disposal;	2
4(b)	*any four of:* better / good, education / schools; better health care / more, hospitals / clinics / doctors; better standard of living; better entertainment / 'bright lights'; better food supplies; electricity; better water supply / sanitation;	4
4(c)	*any three of:* the settlement grows very quickly / migrants continue to move in; provision of services is expensive; the city has limited funds available; the city does not always own the land; settlement sites are difficult areas to get services to; difficulty of relocating people;	3

Section B

Question	Answer	Marks
5(a)	thermometer; anemometer; barometer / barograph; rain gauge;	**4**
5(b)(i)	*allow any answer in range of:* 260–270 (mm); August;	**2**
5(b)(ii)	7 (months);	**1**
5(b)(iii)	*any three of:* increases from January to April; with maximum in April of 34°C; decreases to September / with temperature of 28°C; increases to October / with temperature of 30.5 / 31°C; decreases to December / with minimum in January / December of 25.5°C / 26°C; decrease in wet season; lowest temperature when no rainfall; two maxima / two minima;	**3**
5(c)(i)	*any three of:* dry / dead / brown, grass; grass in tufts / long grass; bush with, no leaves / dry; bush with thorns / thorny bush; scattered / clustered / few, trees; some trees have no leaves / leaves on trees; trees with flat tops; trees of different heights;	**3**
5(c)(ii)	*any two of:* grass, taller / greener; leaves on all, trees / bushes; plants have flowers;	**2**

Question	Answer	Marks
5(c)(iii)	*producer:* organisms that manufacture their own food by the process of photosynthesis; *consumer:* consumers feed on the producers / other animals;	**2**
5(c)(iv)	*any four of:* grass reduced / bare ground / loss of vegetation; less food for grazing wild animals; so decrease in grazing animals; leading to decrease in predators; leading to soil erosion; young trees / bushes eaten; leading to loss of tree cover; loss of habitats for, insects / birds; goats strip leaves from trees so trees die; AVP;	**4**
5(d)(i)	*1950 allow any answer in range of:* 4–5 (million); *2015 allow any answer in range of:* 44–45 (million);	**2**
5(d)(ii)	*allow any answer in range of:* 60–70 (million);	**1**
5(d)(iii)	*any four of:* lowering of death rate / longer life expectancy; reasons for decrease in death rate (*allow to max of two marks*);; birth rate has, remained high / only fallen slowly; reasons why birth rate little changed (*allow to max of two marks*);; more women in fertile age group;	**4**
5(e)(i)	*correctly drawn bars for:* *male 20–24 2.0 million;* *female 5–9 3.1 million;*	**2**

Question	Answer	Marks
5(e)(ii)	*any four of:* schools / education, for large numbers of children; large young dependent population; high unemployment as young reach working age; shortage of housing; shortage of medical supplies; shortage of food; infrastructure problems explained (water, sanitation, etc.) (*allow to max of two marks*);; social problems explained (crime, overcrowding, etc.) (*allow to max of two marks*);; problems of few old people explained;	**4**
5(f)	*Level of response marked question:* Level 3 [5–6 marks] Answers must look at both sides of the argument and reach a conclusion (five marks). For six marks candidate needs to show that they understand reduction in population growth rate only slows, rather than reduces, population. Detail of at least two aspects needed for this level. Level 2 [3–4 marks] Answers may look at both sides of the argument; but with only limited detail. More likely they will be one-sided. Good answers of this type covering at least two aspects can achieve four marks; those that lack some detail, three marks. Level 1 [1–2 marks] Answers will be basic with little detail / explanation. Most will be descriptive or a list of problems caused by increasing population without really addressing the question. No response or no creditable response [0]. *Level of response marking indicative content:* *Some may take the view that increasing population means increasing depletion of resources; food and water shortages and environmental pollution. Others may take the view that changes to renewables will reduce climate change and resource depletion and that recycling and fairer distribution of resources is the answer. Balanced views will take in aspects of both sides and may suggest that stabilising population should be the aim. Some may refer to change in China's one child policy. Slowing rate of population growth will not stop population growing; it will simply grow more slowly.*	**6**

Question	Answer	Marks
6(a)(i)	*any three of:* within the tropics; (mainly) close to coasts; more on east coasts (than west coasts); especially between Asia and Oceania / in the Pacific; some in middle of oceans (around islands); list of the areas;	**3**
6(a)(ii)	too cold / AVP;	**1**
6(b)	positive relationship OWTTE; anomaly at 220 coral species;	**2**
6(c)(i)	*all three correct, in the same order and correct shading [2]* *one correct and correct shading [1]* *all three correct but no shading / incorrect shading [1]*	**2**
6(c)(ii)	Oceania; *allow any answer in range of:* 58–59; low;	**3**
6(c)(iii)	*any three of:* variance in protection methods; enforcement of protection; demand for fish; for example, population size, good infrastructure, eat a fish diet etc.; some reefs are more productive therefore more fishing is done; education of those who catch fish; accessibility of reefs;	**3**
6(c)(iv)	*any one of:* growth of population / growth of demand; technology, such as sonar; increase in size of, boats / nets;	**1**

Question	Answer	Marks
6(c)(v)	*any four of:* quotas; international agreements; banning fishing in certain areas; increase size of net apertures; smaller nets; no fishing during breeding season; increased use of aquaculture; use of sustainable fishing methods, e.g. rod and line;	**4**
6(d)(i)	phytoplankton;	**1**
6(d)(ii)	(*phytoplankton*), zooplankton, corals, fish, (*seals*);; *(if answer incorrect, allow one mark for two correct organisms [1])* *arrows drawn going up food chain*;	**3**
6(d)(iii)	*any three of:* increase in fish; increase in predatory fish; which may cause decline in fish numbers; decrease in crown-of-thorns starfish; so corals increase; but increase in fish numbers may cause decrease in corals; invertebrates decrease; so may be an increase in corals; OR invertebrates increase as fewer predatory fish; so corals decrease; if corals decrease zooplankton increase; and phytoplankton decrease; if corals increase zooplankton decrease; and phytoplankton increase; AVP;	**3**
6(d)(iv)	*any two of:* have few predators so no control of numbers; so large numbers will eat a lot of coral; each one can destroy, $6\,m^2$ / a large area of coral, per year;	**2**

Question	Answer	Marks
6(e)	*any two from each category, up to max six:* *oil refinery:* oil causes birds' feathers to lose ability to regulate body temperature / so they cannot fly / so they lose their waterproofing; birds / fish, may swallow oil which is poisonous / eggs or larvae killed by oil; eggs / larvae, of many fish killed by oil; oil damages fish gills so they die from lack of oxygen; oil on the surface stops photosynthesis so phytoplankton die / reduces dissolved oxygen / suffocates fish; oil clumps onto the sea bed and coats coral / other organisms; *farming:* release of pesticides may poison, fish / other marine life; excess, fertilizer / animal waste, can lead to, algal blooms / causes eutrophication; dead / decaying algae / plants, decrease oxygen levels so marine animals die; soil erosion / sediment, washed into the water kills corals; *lead mining and processing:* lead (which is a heavy metal) is, poisonous / toxic; invertebrates and other sea-bed feeders ingest lead; concentrates in organs such as the liver as little lost through faeces; so such organisms are very toxic to consumers; bioaccumulation of lead can occur; acid from lead processing lowers the pH of seawater; lead affects the nervous system of fish;	**6**

Question	Answer	Marks
6(f)	*Level of response marked question:* Level 3 [5–6 marks] Must include an international dimension for this level. Answer will give details of problems of controlling pollution. Level 2 [3–4 marks] Answers will cover a number of aspects with limited explanation **or** maybe one reason in depth. Level 1 [1–2 marks] Answer may well be a list or descriptive rather than an explanation **or** may provide a basic explanation of one or two points. A list of sources of pollution but no methods of control would achieve max Level 1. No response or no creditable response [0]. *Level of response marking indicative content:* *Marine pollution spreads with ocean currents and so its effects are not limited to the area offshore from the polluter; so if some nations take action there will still be pollution from others. Pollution may also occur outside territorial waters; such as oil spillages; cleaning oil tanks illegally and particularly dumping of plastics from ships. So while local action can reduce marine pollution on a local scale; that environment will still be affected by external sources. Vast amounts of pollutants such as plastics are long lasting; CO_2 increases acidity and atmospheric CO_2 levels are at an all-time high.*	**6**