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**ENVIRONMENTAL MANAGEMENT**

**5014/12**

Paper 1

**October/November 2017**

MARK SCHEME

Maximum Mark: 120

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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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question	Answer	Marks
1(a)(i)	removal in layers; becomes, larger / deeper / description of hole;	<b>2</b>
1(a)(ii)	it takes the, rock / ore, to the, crusher / smelter / surface;	<b>1</b>
1(b)	<p><i>landscaping:</i> removal of unsightly waste heaps / filling in of holes / screening with trees (to improve the appearance of the area); legislation;</p> <p><i>water treatment:</i> to screen out any toxic metals / pollutants from water used in the processes; legislation;</p> <p><i>new technology to reduce energy use:</i> economic / cheaper / reduces use of fossil fuels / reduces emissions of CO<sub>2</sub>; legislation;</p>	<b>3</b>
1(c)	<p><i>any four from:</i> ore too low grade to be economic to mine; exhaustion of the ore reserves; too expensive to mine / accessibility; price of the ore too low; fall in demand for the ore / over-supply; competition from products made from other material / example of; competition from more economical mines; become too dangerous; government decision; company becomes bankrupt / lack of investment;</p>	<b>4</b>

Question	Answer	Marks
2(a)(i)	snow melt;	1
2(a)(ii)	<i>any two from:</i> to prevent / reduce, flooding; to store / supply, water (to Los Angeles / city); HEP; irrigation;	2
2(a)(iii)	there is plenty of water available (in the mountains) where few people live and there are cities where water shortages will occur (in the dry summers);	1
2(a)(iv)	<i>any two from:</i> evaporation; infiltration; precipitation; condensation; surface run-off; throughflow; groundwater flow;	2
2(b)	<i>any four from:</i> reduces in volume qualified; increases in volume qualified: polluted by discharges of industrial waste; oil spills; polluted by sewage disposal; especially if drains overflow / after heavy rains; polluted by, rubbish / litter; less, animal / plant life ; may be in culvert / covered over; artificial / concrete, channel; straightened;	4

Question	Answer	Marks
3(a)(i)	28 Sept / 29 Sept / 30 Sept / 1 Oct / 2 Oct / 3 Oct;	1
3(a)(ii)	<i>any two from:</i> ozone amounts (generally) are only a little higher than the lowest recorded levels; were the same as the lowest recorded levels at times; at lowest recorded levels, two / three times / on days in, July and August; are (well) below the highest levels;	2
3(b)	<i>any four from:</i> Montreal Protocol / many countries agreed to take action to protect ozone; 1989 more countries agreed to act; stopped use of CFCs; stopped use of halons; replacements used in, refrigerators / aerosols / air conditioning; national / government, legislation; use of catalytic converters linked to oxides of nitrogen; reduced use of, aerosols / air conditioning;	4
3(c)	<i>any three from:</i> CFCs / halons were widely used; CFCs escaped into the atmosphere when aerosols were used / when refrigerators were broken up etc.; travelled round the world, in the atmosphere / by wind / air currents; there are no international boundaries in the atmosphere; poorer countries could not afford / needed financial assistance from other countries, to switch to using less harmful chemicals;	3

Question	Answer	Marks
4(a)(i)	bar correctly plotted at 8 500 000;	1
4(a)(ii)	4 200 000 / 4.2 million;	1
4(a)(iii)	30%;	1

Question	Answer	Marks
4(b)(i)	<p><i>any three from:</i>            lack of jobs;            lack of education;            few professional occupations / well-paid jobs;            low crop yield because, drought / floods / cyclones / poor farming practices;            no surplus for sale / no income / low income;            malnutrition / illness, reduces capacity to work, which reduces crop yield;            population pressure forces use of poorer quality land;            cannot afford fertilisers / soil exhaustion / soil erosion;            large size of families / many children to support / lack of family planning;            greater investment in urban areas;</p>	<b>3</b>
4(b)(ii)	<p><i>any four from:</i>            set up factories / plantations / forests etc., to provide work;            irrigation schemes;            cooperative schemes help to purchase, seeds / fertiliser etc;            help with marketing;            provide education;            improve water supplies / sanitation;            provide electricity;            improve roads;            more, medical centres / clinics / doctors / nurses / family planning clinics / advice;            teach craft making;            community participation in improvement schemes;</p>	<b>4</b>

Question	Answer	Marks
5(a)(i)	desert;	<b>1</b>
5(a)(ii)	6(%)	<b>1</b>
5(a)(iii)	38(%)	<b>1</b>

Question	Answer	Marks
5(b)	<i>any three from:</i> mainly within the Tropics; near the Equator; north of South America; east of Africa; SE Asia; identification of an exception area; named area or country for example, Amazon Basin;	<b>3</b>
5(c)(i)	January correctly plotted at 380; February correctly plotted at 310;	<b>2</b>
5(c)(ii)	<i>any two from:</i> high annual rainfall / 2555 mm; rainfall in every month of the year; maximum is, 380 mm / in January; minimum is, 100 mm / in August and October; dry season from June to October / wet season from Nov to May;	<b>2</b>
5(c)(iii)	August / September;	<b>1</b>
5(c)(iv)	3 (°C);	<b>1</b>
5(d)(i)	<b>X</b> emergent layer; <b>Y</b> canopy layer / middle canopy;	<b>2</b>
5(d)(ii)	52 / 53 (m);	<b>1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
5(d)(iii)	<p><i>any three buttress roots points with one drip-tip leaves point OR any three drip-tip leaves points with one buttress roots point OR any two buttress roots points with any two drip-tip leaves points:</i></p> <p><i>buttress roots:</i> rainforest soils only fertile at top; so rainforest tree roots, are shallow / cover a large area; rainforest trees are very tall; buttress roots are needed for support;</p> <p><i>drip-tip leaves:</i> heavy daily rainfall; leaves shaped to shed rainfall; to maximise, transpiration / photosynthesis / absorb sunlight;</p>	<b>4</b>
5(e)	<p><i>any three from:</i> fuelwood; subsistence farming; cash cropping; settlement / urbanisation / factories; logging; grazing; roads; mining;</p>	<b>3</b>
5(f)(i)	<p>appropriate scale; accurate plots; labelling of axes;</p>	<b>3</b>
5(f)(ii)	<p>11(%)</p>	<b>1</b>

Question	Answer	Marks
5(f)(iii)	<p><i>any four from:</i>  unemployment;  people displaced / forced to move;  as source of food disappears;  as homeland is developed;  loss of land rights;  conflict with logging companies;  loss of fuelwood;  loss of traditional culture / traditional culture dies out / become westernised;  loss of medicines;  western diseases affect health;  job creation;  wood available for local industries;  better transport;  land available for, farming / development;  displaced animals threat to humans;</p>	4
5(g)	<p><i>no mark for saying whether agree or disagree, answer can focus on one or the other or both:</i></p> <p><i>agree:</i>  only mature trees are taken;  so younger trees have chance to grow;  forest not clear felled;  some trees are left;  forest has chance to, repair / regenerate;</p> <p><i>disagree:</i>  method is more expensive;  difficult to enforce;  regular checks required on logging companies;  needs investment;  not a solution for areas already cleared;</p>	4



Question	Answer	Marks
5(h)	<p><i>Level of response marked question:</i></p> <p>Level 3 [5–6 marks] Developed ideas used to show how two techniques can improve sustainable management of forests. Descriptions follow a logical order and show a clear understanding of the techniques selected.</p> <p>Level 2 [3–4 marks] Developed ideas used to show how one or more techniques can improve sustainable management of forests. Response is less detailed.</p> <p>Level 1 [1–2 marks] Simple ideas used to show how one or more techniques can improve sustainable management of forests. Responses may include some irrelevant or inaccurate information.</p> <p>No response or no creditable response [0].</p> <p><i>Level of response marking indicative content:</i></p> <p>Candidates may begin with a definition of the chosen technique.</p> <p>For <b>agro-forestry</b> candidates may cover, that trees are retained in production system, it maintains fertility of the soil, some retained trees may provide income, and the benefits of trees (e.g. shade) to the farming system.</p> <p>For <b>fuelwood planting</b> candidates may cover coppicing, crop rotation, growing of more productive species, faster growing, that established forests are no longer needed, and that the wood could be sold.</p> <p>For <b>reforestation</b> candidates may cover planting trees with the potential for production, allowing succession, that the land is not left bare, and that it maintains biodiversity.</p> <p>For <b>community forestry</b> candidates may cover, the fact it provides jobs, the local community feel involved, there is active management and conservation, education, the products and profits are distributed locally, and the opportunities for ecotourism.</p>	6

Question	Answer	Marks
6(a)	crust, plates, core ;;  3 correct [2 marks] 1 or 2 correct [1 mark]	<b>2</b>
6(b)	<i>any three from:</i> along plate boundaries; in long, narrow belts; around the edge of the Pacific Ocean; concentration in named area of the world; identification of volcanoes not on plate boundary e.g. East Africa;	<b>3</b>
6(c)(i)	<b>X</b> crater; <b>Y</b> magma / magma chamber; <b>Z</b> ash / ash cloud / gases;	<b>3</b>
6(c)(ii)	percentages; plotting; shading;	<b>3</b>
6(c)(iii)	<i>any four from:</i> volcanoes give out warning signs; example, such as, bulge / release of ash / gases released; people have more time to prepare; people have more time to evacuate; people educated to deal with an eruption; new activity on top of volcano where few people live; some eruptions are not violent; earthquakes may cause damage a long way from epicentre;	<b>4</b>
6(d)(i)	labelling of y-axis, average visitor numbers per month; Mar correctly plotted at 20 000; May correctly plotted at 200 000;	<b>3</b>
6(d)(ii)	June, July and August;	<b>1</b>

Question	Answer	Marks
6(d)(iii)	180 000;	<b>1</b>
6(d)(iv)	<p><i>any four from:</i>  gives time for people to escape if animal attacks;  bears and wolves are particularly dangerous;  prevents animals from being disturbed;  which may cause them to, leave the area / become startled / affect mating;  the wrong food can cause animals to become ill;  feeding animals will encourage them to come closer which could be dangerous;</p>	<b>4</b>
6(e)(i)	<p><i>any three from:</i>  renewable / won't run out;  continuous;  makes use of natural resources;  cheaper running costs;  does not cause air pollution / release carbon dioxide;  does not contribute to acid rain or global warming;  conservation of fossil fuels;</p>	<b>3</b>
6(e)(ii)	<p><i>any three from:</i>  (ash weathers to give) fertile soils;  so high yields of crops;  mineral extraction or example;  confidence in prediction;  confidence in evacuation and precautions;  risk perception;  high population density elsewhere;  family and friends;  historical / cultural, reasons;  heating / hot water, available;</p>	<b>3</b>
6(f)(i)	tourism that is sustainable / limits damage to the environment;	<b>1</b>
6(f)(ii)	jobs; income;	<b>2</b>

Question	Answer	Marks
6(f)(iii)	whales needed for people to be able to whale watch / protection of the environment where the whales live / develops awareness of animal;	<b>1</b>
6(g)	<p><i>Level of response marked question:</i></p> <p><b>Level 3 [5–6 marks]</b> Answers will be detailed and well-rounded. Many different aspects of the ways in which tourism can damage the environment will be covered. Response shows a clear understanding of the topic.</p> <p><b>Level 2 [3–4 marks]</b> Answers will include developed ideas used to describe ways in which tourism can damage the environment. They will be good answers but may lack detail.</p> <p><b>Level 1 [1–2 marks]</b> Simple ideas used to describe the ways in which tourism can damage the environment, which may be in the form of a list. Some information may be vague or irrelevant.</p> <p>No response or no creditable response [0].</p> <p><i>Level of response marking indicative content:</i> Responses might include concepts such as erosion, deforestation and habitat destruction. Candidates may say animals will be scared away by human activity and some may cover trophy hunting. The types of pollution tourism can produce e.g. water pollution, litter, noise pollution and visual pollution, are likely to be covered. More specific examples of damage, such as damage to coral reefs and disruption to particular wildlife may be covered. Some candidates may also cover the increased transport, methods and the invasive effects of this.</p>	<b>6</b>