

MARK SCHEME for the May/June 2014 series

5014 ENVIRONMENTAL MANAGEMENT

5014/11

Paper 1, maximum raw mark 120

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Section A

1 (a) (i)

	A	B	C
has the largest particles?			✓
would be the most waterlogged after rain?		✓	
will dry fastest after rain?			✓
is the easiest for plant roots to grow into?			✓

[3]

- (ii) A silty
B clayey
C sandy

Two or three correct for two marks, one correct for one mark.

[2]

- (b) (i) *organic content*: provides nutrients / helps bind soil particles together / is important for soil stability; (clay – humus complex) keeps nutrients in the soil / prevents leaching; helps to retain moisture; source of nutrients;

[1]

- (ii) *soil organisms*: earthworms burrow and provide air / root spaces / improve drainage; mix plant matter with the minerals; fauna digest / breakdown / decompose plant matter / help humus formation;

[1]

- (iii) *air*: needed for soil fauna / plants to respire;

[1]

- (iv) *nutrients*: provide food for plants;

[1]

- (c) it is shallower so insufficient depth for deep roots;
too shallow to plough;

[1]

2 (a) (i) Chagos (Islands);

[1]

- (ii) five (*accept six*);

[1]

- (iii) all a long distance away from the fishing area / Chagos Islands;
all northern hemisphere;
all coastal;
all MEDCs / developed countries;

[1]

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- (b) *Any relevant reasons such as:*
 number / size of fishing vessels;
 overfishing / under-fishing;
 reduces / increases reproduction of fish;
 quotas changed;
 net sizes changed;
 fishing methods changed;
 change in fishing season length;
 reversal of ocean currents / change in sea conditions;
 reduction / increase in food for fish;
 reduction / increase in predators; [4]

- (c) *Any relevant reasons such as:*
 there will be more fish of breeding age;
 it will allow the fish population to increase;
 beneficial impact on the food chain;
 unemployment / loss of income (of fishermen or processing factory workers etc.);
 increase in fish prices;
 (may lead to) less protein in diets;

At least one benefit and one disadvantage. [3]

- 3 (a) (i) wind vane; [1]
 (ii) south; [1]
 (iii) A – (arrow / blade) points to the direction from which the wind has come / indicates the wind direction;
 B – (shaft / pole) raises the arrow above the roof / reduces the effect of friction;
 C – (compass / cardinal points) identifies the direction; [3]
 (iv) on roof / high (above ground); [1]
 (v) no obstructions to deflect the wind; [1]

 (b) (i) drawn length shows four days from the east; [1]
 (ii) prevailing wind / most frequent wind direction can be identified;
 wind break at right angle to the prevailing wind direction; [2]

 4 (a) (i) 37; [1]
 (ii) decline to year 2 / in first year;
 increase next 2 years / year 2 to year 4;
 decrease since year 4 / year 4 to year 10; [2]
 (iii) no till; [1]
 (b) (i) it saves the cost of the fuel needed for ploughs / harrows; [1]

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(ii) moisture evaporates more quickly from a tilled soil / increased drought makes the soil drier especially if tilled; [1]

(c) (i) *Credit any valid idea, such as:*
 shades the soil so it does not dry out so quickly, so it is less likely to be moved;
 moist soil is heavier than dry soil;
 moist soil particles stick together / dry soil crumbles;
 mulch protects the soil from the wind;
 mulch protects the soil from raindrop impact;
 mulch encourages rain to infiltrate / reduces run-off; [3]

(d) *Any valid method by which soil erosion by water can be reduced, such as:*
 terracing;
 contour ploughing;
 covering the soil with a mulch;
 strip cropping;
 cover cropping;
 planting trees in gullies;
 check dams across gullies;
 Etc.; [1]

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Section B

- 5 (a) (i) Table infilling from left to right: 2 : 2 : 10 : 0 : 2 : 4 : 20 : 16 : 4
or 1 : 2 : 11 : 0 : 2 : 4 : 17 : 3

All correct for three marks

or

all six correct continents for two marks,

at least three correct for one mark,

ratio correct for one mark.

[3]

- (ii) more megacities / great increase in numbers;
more further south / in lower latitudes;
more in the tropics than in temperate lands;
many more / most in Asia;
more widespread throughout;
Europe / Africa now have mega-cities;
none in Australia;

[2]

- (iii) less use / availability of methods of contraception;
greater economic need for and value of children;
absence of / weak national population policies / government attitude;
religious reasons;
poor / absence of education especially for women;
tradition of large families;
large proportion of women are of child-bearing age;
all in death rate explained;

Remember that the question focus is upon developing countries.

Reason for one mark.

Further development / elaboration for one mark.

[4]

- (iv) already much urbanisation in developed world countries;
less difference in services between rural and urban areas in developed countries;
greater poverty and absence of modern facilities in rural areas;
natural and human disasters may drive people out such as flood, wars;
industrialisation in developing / jobs in urban areas;
in developed countries people wish to escape crime / pollution / noise of cities;

[2]

- (b) (i) plots complete and accurate on the divided bar for two marks
at least two plotted correctly for one mark
labelling for one mark

[3]

- (ii) *push factors* D E
pull factors A B C F

All correct for three marks, 4 or 5 correct for two marks, 2 or 3 correct for one mark. [3]

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- (iii) driven out by a natural disaster / drought;
 jobs only in farming in rural areas / more variety in urban;
 better paid jobs in urban;
 shortage of land / land not owned / declining soil fertility;
 in the poverty trap;
 'bright lights syndrome';
 war / conflict;

No credit for public services. [1]

- (iv) 4:2 ratio of pull : push factors;
 70% : 18%;

*Pull more important than push (reserve one mark);
 Both important, but pull more so;* [2]

- (c) (i) piped water supply;
 sewerage / sanitation;
 electricity;
 health care;
 education;
 rubbish collection;
 transport;
 etc.;

[1]

- (ii) piped water or sanitation
 disease / health problems;
 electricity;
 no light crime rates high / no fridge food goes off;
 health care;
 too sick to work / high death rates;

Credit other relevant correct amenity.

Valid consequence identified for one mark Further development for second mark [2]

- (iii) *Characteristics of slum housing:*
 self-built / haphazard collection of building materials / examples of building materials used / poorly built;
 lack running water / toilets / power / etc.;
 unplanned / very high density / narrow alleyways between small houses;
 most with only one storey and just one or two rooms;

Types of locations for poor houses:
 unused land / often unused for a good reason such as liable to flood;
 cheap land on steep (unstable) slopes;
 edge of cities;
 undeveloped site;
 along main transport links
 next to a source of pollution such as a factory;
 next to rivers and on swampy land; (which increases disease risks)

Two marks for each of the two parts of the question. [4]

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(iv) cooperating to install water / sanitation;
self-help schemes;
from income on formal or informal sector;
petitioning government / protests; [2]

(v) providing essential services such as water, electricity and roads;
so that they are linked into the rest of the urban area;
community participation schemes;
such as ASH (Aided Self-Help) for obtaining building materials and technical help,
sometimes with small loans;
affordable housing;
basic but attractive to people in need of cheap housing;
providing security of tenures; so people are willing to invest in/improve their homes/
services;
site and service schemes;

Give full credit for references to a relevant named example.

One line of explanation followed, without significant development or reference to an example. Or a general answer describing improvements lacking in detailed explanation for one or two marks.

Fuller and more precise explanation; has some width and/or depth to it for three or four marks. [4]

(d) (i) *Pollution:*
air, water and land pollution;
air pollution from factories and traffic;
impact of pollution;

Congestion:
traffic congestion from cars and/or lorries;
increasing number of vehicles;
old road / narrow streets;
lack of transport planning;

Loss of agricultural land:
sprawl / growth of the city into surrounding rural areas / land built on;
unplanned / uncontrolled;
less food produced;
non-stop growth from in-migration;
Three at one mark each. [3]

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- (ii) traffic congestion in large cities;
old city areas not suitable modern traffic;
worse in developing, no money to deal with problem;
lack of knowledge/technology;
lack of government will/leadership to enforce regulation;
speed of development in newly developing;
many migrants putting pressure on existing services;
pressure on space little resistance to urban sprawl;

Credit use of specific city references.

General answers, more stating than giving reasons. Perhaps deals adequately with only one of the question themes. One point about each question without much elaboration for either for one or two marks.

More precise answers, based upon giving reasons for two themes. Development of these reasons shows a higher level of understanding about both question themes. May include something specific such as a city example for one part, which helps to offset the outline answer given to the other for three or four marks. [4]

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- 6 (a) (i) in the extreme north of the continents/land masses;
 mostly confined to polar lands north of 60°/high latitudes;
 extend for the full width across the continents of North America and Europe;
 narrow strip around the coastal edges of Greenland;
 further south in west and/or east in North America/in east in Asia;
 covers the islands off northern Canada/Asia;
 coastal; [3]
- (ii) continents without land south of 60°; the southern continent of Antarctica is too far south/covered by ice and snow; [1]
- (b) (i) accurate plots for two marks
 2 correct for one mark [2]
- (ii) 29°C [1]
- (iii) 9 months below freezing point/cold most of the year;
 highest summer temperature only +5°C/even summers are cold;
 temperatures below –20°C make it extremely cold;
 average temp. –11°C;

 low average annual precipitation total (65–70 mm);
 not more than 5 mm of rain in 9 of the months;
 max monthly rainfall only 13 mm;
 under 250 mm per year is the definition for a desert climate;

*Give marks for the use of values from the graph/table which support the answer.
 Maximum one mark for answers without supporting use of direct evidence.
 Maximum two marks for answers that are either all temperature or all precipitation.* [3]
- (iv) *Labels*
 at tundra latitudes
 Sun's rays have a large area of Earth's surface to heat up;
 longer journey through the Earth's atmosphere/more sunlight reflected at Equator;
 Sun's rays shorter journey through Earth's atmosphere;
 smaller area of the Earth's surface to heat up; [3]
- (c) (i) vegetation is visible on only a few areas;
 (short) grass/flowers;
 many bare rocks without visible vegetation;
 bare ground also where rock is loose as in foreground/steep slopes in the background;
 marked absence of any taller bushes and trees/short vegetation;
 low-lying bushes/shrubs; [3]

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- (ii) soil is too thin to allow ploughing / digging for crop growing / not much soil;
not much grass and vegetation shown on the photograph for grazing animals;
too large a proportion of the area is covered by bare or loose rock;
- summer temperatures are never warm enough for cultivation / too cold for farming;
maximum temperature is only 5°C in July;
frost-free period too short with below freezing average temperatures from September to May;
little precipitation available / a lot of it may fall as snow;
- Two marks max. photo only.*
Two marks max. climate only.
Three explanatory points at one mark each, placed in the context of farming. [3]
- (d) (i) plants / grass / named arctic plant; [1]
- (ii) phytoplankton → zooplankton → fish → (people)
organisms correct; [2]
arrows correct;
- (iii) less fish for seals so fewer seals;
fewer fish for people so they eat more caribou;
fewer caribou so more plants for lemmings and insects;
caribou decline so more plants = more lemmings;
more lemmings and insects so more food for foxes;
less fish so more zooplankton;
more zooplankton less phytoplankton;
fewer seals for polar bears;
- Must indicate decline or increase.* [3]
- (e) (i) difficult – remote / takes long time to get there;
extreme cold / workers welfare;
sea ice makes searching from ships difficult;
limited services / facilities on land;
have to pay high wages;
expensive- cost of getting there;
supporting workforce at base / on ship; [2]
- (ii) 6–7 times circled; [1]
- (iii) rising world oil prices;
makes Greenland more cost effective / covers costs;
figures quoted from graph; [2]

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- (f) (i) *Opinion*
Greenlanders are (overwhelmingly) in favour of exploration going ahead;
Explanation
provide a new source of income;
development of new income sources;
previously dependent on a narrow range of activities (fishing, tourism, gold mining);
increases their independence / lowers their dependence on Denmark's subsidy;
further economic development possible / jobs health education; [4]
- (ii) *Problems*
risks of pollution from leaks and spills;
examples like the Exxon Valdez in Alaska;
cold climate means that environmental damage takes much longer to be naturally repaired;
marginal areas for wildlife;
fewer wilderness areas remain, those that do are under increasing pressure from humans;
- One mark per problem briefly stated to a max. of two marks.*
Development of problems for further marks. [3]
- (iii) aware of the environment and extra regulations placed on the oil companies;
adequate safety and measures to protect environment from problems stated;
Greenland should not be denied the chance to exploit its own resources just because wilderness areas have disappeared elsewhere for economic growth;
global warming if applied to Greenland;
yes, because could threaten fish stocks / way of life;
could threaten tourist trade;
cost-benefit applied; [3]

[Total: 120]